2020-03

LOOKING BEYOND THE HORIZON: MODELING DHS NET ASSESSMENT

Davis, Michael A., Jr.

Monterey, CA; Naval Postgraduate School

NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

THESIS

LOOKING BEYOND THE HORIZON: MODELING DHS NET ASSESSMENT

by

Michael A. Davis Jr.

March 2020

Thesis Advisor:	Erik J. Dahl
Second Reader:	Glen L. Woodbury

THIS PAGE INTENTIONALLY LEFT BLANK

REPORT DOCUMENTATION PAGE			*Form Approved OMB No. 0704-0188*

1. AGENCY USE ONLY *(Leave blank)*	**2. REPORT DATE** March 2020	**3. REPORT TYPE AND DATES COVERED** Master's thesis

4. TITLE AND SUBTITLE LOOKING BEYOND THE HORIZON: MODELING DHS NET ASSESSMENT	**5. FUNDING NUMBERS**
6. AUTHOR(S) Michael A. Davis Jr.	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey, CA 93943-5000	**8. PERFORMING ORGANIZATION REPORT NUMBER**
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) N/A	**10. SPONSORING / MONITORING AGENCY REPORT NUMBER**

11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.

12a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release. Distribution is unlimited.	**12b. DISTRIBUTION CODE** A

13. ABSTRACT (maximum 200 words)

This thesis explores the modification of the Department of Defense (DOD) framework and model of net assessment for use by the Department of Homeland Security (DHS). The DOD uses net assessment to forecast strategically, often decades into the future, to determine where a net advantage or disadvantage exists over its adversaries. The information from such an analysis is then used by the DOD to determine where to best focus its resources in meeting these future adversaries. This thesis utilizes the corollary inputs, analysis, and outputs between DOD and DHS strategic models to visualize a notional framework that can be used to conduct these net assessments for DHS beyond the typical strategic plan timescale. For each DOD input and output, a comparable DHS input and output is selected. An example DHS net assessment is conducted to explore the viability of the model.

14. SUBJECT TERMS net assessment, DHS, homeland security, strategy, strategic planning	**15. NUMBER OF PAGES** 127
	16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	**18. SECURITY CLASSIFICATION OF THIS PAGE**	**19. SECURITY CLASSIFICATION OF ABSTRACT**	**20. LIMITATION OF ABSTRACT**
Unclassified	Unclassified	Unclassified	UU

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. 239-18

THIS PAGE INTENTIONALLY LEFT BLANK

Approved for public release. Distribution is unlimited.

LOOKING BEYOND THE HORIZON: MODELING DHS NET ASSESSMENT

Michael A. Davis Jr.
Assistant Special Agent in Charge, U.S. Secret Service,
Department of Homeland Security
BS, U.S. Naval Academy, 1995
MBA, University of Maryland University College, 2008

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF ARTS IN SECURITY STUDIES
(HOMELAND SECURITY AND DEFENSE)

from the

NAVAL POSTGRADUATE SCHOOL
March 2020

Approved by: Erik J. Dahl
Advisor

Glen L. Woodbury
Second Reader

Erik J. Dahl
Associate Professor, Department of National Security Affairs

THIS PAGE INTENTIONALLY LEFT BLANK

ABSTRACT

This thesis explores the modification of the Department of Defense (DOD) framework and model of net assessment for use by the Department of Homeland Security (DHS). The DOD uses net assessment to forecast strategically, often decades into the future, to determine where a net advantage or disadvantage exists over its adversaries. The information from such an analysis is then used by the DOD to determine where to best focus its resources in meeting these future adversaries. This thesis utilizes the corollary inputs, analysis, and outputs between DOD and DHS strategic models to visualize a notional framework that can be used to conduct these net assessments for DHS beyond the typical strategic plan timescale. For each DOD input and output, a comparable DHS input and output is selected. An example DHS net assessment is conducted to explore the viability of the model.

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF FIGURES

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF ACRONYMS AND ABBREVIATIONS

CI	critical infrastructure
CPB	Customs and Border Protection
DHS	Department of Homeland Security
DOD	Department of Defense
FEMA	Federal Emergency Management Agency
FY	fiscal year
ICE	Immigrations and Customs Enforcement
INCOSE	International Council on Systems Engineering
IP	intellectual property
NCTC	National Counter Terrorism Center
NOAA	National Oceanic and Atmospheric Administration
NSC	National Security Council
NSSE	National Special Security Events
OMB	Office of Management and Budget
ONA	Office of Net Assessment
OPM	Office of Personnel Management
PFO	principal federal official
QHSR	Quadrennial Homeland Security Review
SE	systems engineering
SPAR	Secretary, Strategy, Plans, Analysis & Risk
UAV	unmanned aerial vehicles
USCG	U.S. Coast Guard
USCIS	U.S. Citizenship and Immigration Services

THIS PAGE INTENTIONALLY LEFT BLANK

EXECUTIVE SUMMARY

The research and analysis within this thesis modifies the Department of Defense (DOD) net assessment model to a viable framework to be used within the Department of Homeland Security (DHS). This model can be used by the DHS to perform long-term strategic planning beyond the typical 4–8 year strategic plan.

Since the 1970s, the DOD utilizes net assessment to conduct long-term strategic analysis. This effort began in 1969, when the DOD recognized the need to compare the U.S. military capabilities to those of the Soviets. In 1972, the DOD created the Office of Net Assessment (ONA). Its initial purpose was to evaluate the capability gap between the United States and the Soviet Union in areas, such as the military, economy, and nuclear arsenal.[1]

The DOD net assessment is designed to evaluate capabilities and identify gaps at all levels. It gauges the United States' capabilities versus an enemy's capabilities to examine if a gap exists. If a gap exists, is it increasing or decreasing? Finally, the DOD net assessment evaluates the severity and root causes of the capability gap. It specifically excludes solutions or recommendations to close or address any capability gap.[2] Net assessment focuses on future strategic environments and the struggle between nation states and adversaries.[3]

DHS has a function similar to the DOD in terms of protecting against an adversary (such as against cyber threats or a pandemic). DHS also has a need to evaluate its own

---

[1] Andrew F. Krepinevich and Barry D. Watts, *The Last Warrior: Andrew Marshall and the Shaping of Modern American Defense Strategy* (New York: Basic Books, 2015), ch. 4, Adobe Digital Edition.

[2] Department of Defense, *Director of Net Assessment*, DOD Directive 5111.11 (Washington, DC: Department of Defense, 2009), 2, www.dtic.mil/whs/directives/corres/pdf/511111p.pdf; Andrew Marshall, "National Net Assessment" (official memorandum, Washington, DC: Digital National Security Archive 1973).

[3] Patrick Forrest and Alex Hilliker, "Why the Department of Homeland Security Needs an Office of Net Assessment," *Risk, Hazards & Crisis in Public Policy* 3, no. 3 (September 1, 2012): 1–18, http://onlinelibrary.wiley.com.libproxy.nps.edu/doi/10.1002/rhc3.9/abstract.

capabilities to discover shortfalls in protecting against various threats, such as terrorism, cyber threats, natural disasters, and transnational criminal organizations.[4]

This thesis' literature review explains the current DOD net assessment model and its usage. Further articles show the need for this long-term planning within DHS. Additional literature and research articles show the current DHS planning doctrine and its limitations to scale beyond a few years.

Following the review, a systems engineering model is introduced to visualize the DOD net assessment model. Inputs, outputs, and analysis are defined to create the DOD net assessment model. An analysis of DHS strategic priorities is then conducted. In determining these priorities, inputs, outputs, and analysis for DHS can then be determined. These inputs, outputs, and analysis are then inserted into the DOD net assessment model to create a notional DHS net assessment model.

Finally, an example DHS net assessment is conducted using this DHS net assessment model. This analysis is conducted utilizing the DHS strategic priority of national preparedness and resilience. DHS defines this strategic mission as this nation's ability to safeguard against and respond to both manmade hazards, such as nuclear terrorism and cyber-attacks, as well as natural disasters.[5]

The thesis concludes with additional suggestions for further research and modification of the DOD net assessment model to include more complex scenarios, such as the introduction of neutral and allied forces within the model.

[4] Department of Homeland Security, *The 2014 Quadrennial Homeland Security Review* (Washington, DC: Department of Homeland Security, 2014), 6–8, https://www.dhs.gov/publication/2014-quadrennial-homeland-security-review-qhsr.

[5] Department of Homeland Security, 71.

ACKNOWLEDGMENTS

I would like to acknowledge my wife, Mary Ellen, and daughter, Isabella. I love you both, and you push me to never stop learning.

I would also like to acknowledge my advisor, Dr. Erik Dahl, whose valuable guidance and merciful patience with my delays pushed me through to the end.

THIS PAGE INTENTIONALLY LEFT BLANK

I. INTRODUCTION

A. RESEARCH QUESTION

This thesis attempts to answer the following questions:

- Given the need for the Department of Homeland Security (DHS) to engage in a homeland security net assessment effort, what information would be gathered for input into a homeland security net assessment model?
- Conceptually, what would a DHS net assessment framework look like? What kind of analysis would be done to DHS capabilities to result in a net assessment?
- What would be the framework of a homeland security net assessment model? This answer may vary depending on the inputs given.

B. PROBLEM STATEMENT

Since the 1970s, the Department of Defense (DOD) utilizes net assessment to conduct long-term strategic analysis. This effort began in 1969, when the DOD recognized the need to compare the U.S. military capabilities to those of the Soviets. In 1972, the DOD created the Office of Net Assessment (ONA). Its initial purpose was to evaluate the capability gap between the United States and the Soviet Union in areas, such as the military, economy, and nuclear arsenal.[1]

The DOD net assessment is designed to evaluate capabilities and identify gaps at all levels. It gauges the United States' capabilities versus an enemy's capabilities to examine if a gap exists. If a gap exists, is it increasing or decreasing? Finally, the DOD net assessment evaluates the severity and root causes of the capability gap. It specifically

[1] Andrew F. Krepinevich and Barry D. Watts, *The Last Warrior: Andrew Marshall and the Shaping of Modern American Defense Strategy* (New York: Basic Books, 2015), ch. 4, Adobe Digital Edition.

excludes solutions or recommendations to close or address any capability gap.[2] Net assessment focuses on future strategic environments and the struggle between nation states and adversaries.[3]

DHS has a function similar to the DOD in terms of protecting against an adversary (such as against cyber threats or a pandemic). DHS also has a need to evaluate its own capabilities to discover shortfalls in protecting against various threats, such as terrorism, cyber threats, natural disasters, and transnational criminal organizations.[4]

Since the creation of DHS in 2003, recommendations have been made for DHS to conduct homeland security net assessments.[5] With the exception of the National Counter Terrorism Center's net assessment of terrorists' capabilities, DHS does not conduct net assessments on homeland security issues. Despite having an Office of Strategic Policy, a strategic plan and the Quadrennial Homeland Security Review (QHSR), DHS lacks the ability to forecast homeland security capabilities and threats beyond a near-term horizon.[6] This thesis explores the potential for DHS to utilize a net assessment model for long-term strategic planning.

This thesis proposes that because the strategic planning frameworks of the two organizations are closely aligned, the DOD net assessment strategic analysis model can be used (with modifications) by DHS to forecast trends in homeland security beyond the limits of intelligence information and extending past budget cycles or Presidential and other

---

[2] Department of Defense, *Director of Net Assessment*, DOD Directive 5111.11 (Washington, DC: Department of Defense, 2009), 2, www.dtic.mil/whs/directives/corres/pdf/511111p.pdf; Andrew Marshall, "National Net Assessment" (official memorandum, Washington, DC: Digital National Security Archive 1973).

[3] Patrick Forrest and Alex Hilliker, "Why the Department of Homeland Security Needs an Office of Net Assessment," *Risk, Hazards & Crisis in Public Policy* 3, no. 3 (September 1, 2012): 1–18, http://onlinelibrary.wiley.com.libproxy.nps.edu/doi/10.1002/rhc3.9/abstract.

[4] Department of Homeland Security, *The 2014 Quadrennial Homeland Security Review* (Washington, DC: Department of Homeland Security, 2014), 6–8, https://www.dhs.gov/publication/2014-quadrennial-homeland-security-review-qhsr.

[5] David Heyman and James Jay Carafano, *DHS 2.0: Rethinking the Department of Homeland Security,* (Washington, DC: The Heritage Foundation, 2004), 12, http://gateway.proquest.com/openurl?url_ver=Z39.88-2004&res_dat=xri:policyfile&rft_dat=xri:policyfile:article:00069909.

[6] Erik Dahl, "A Homeland Security Net Assessment Needed Now!" *Strategic Studies Quarterly* 9, no. 4 (2015): 62–86, http://search.proquest.com/docview/1812272885.

elected officials' terms. The thesis focuses on the net assessment model itself rather than the need for a net assessment, a policy to support a net assessment, or the organizational model for a proposed DHS ONA. Additional information on the frameworks, strategic policies, and justifications are given later within the literature review in this chapter.

C. ASSUMPTIONS AND LIMITATIONS

The thesis makes some assumptions. First, based on the literature review presented in the next section, this thesis assumes that the need for a homeland security net assessment model similar to the DOD is valid. Secondly, this thesis assumes that if a similar effort were undertaken for a homeland security net assessment, DHS would be the organization to conduct such a net assessment. Next, this thesis presents a systems engineering (SE) model of inputs, analysis, and outputs to create a visualization of the net assessment model to assist in understanding. It is assumed that this simple model of input, analysis, and output is the best way to visualize the net assessment process for the reader. Finally, this thesis assumes that the DOD net assessment process is a valid model for a homeland security strategy analysis. A review of open source literature shows no other strategic planning frameworks proposed for use by DHS by government experts and scholars.

This thesis has limitations. First, original documents for recent DOD net assessments are unavailable in open sources due to their classification. Since most of the DOD net assessments are classified, many of the original source documents remain classified or are decades old. As the DOD's final net assessments are not available in open source or unclassified, the DOD's net assessment functions cannot be directly analyzed to determine its relevancy to homeland security strategic planning. Scholarly articles on net assessment strategies need to be relied upon rather than original source documents.

Some limitations exist in justifying a net assessment framework as a strategic planning process for DHS. The only current homeland security net assessments conducted by a DHS entity are done by the National Counter Terrorism Center. These net assessments are specific to terrorism issues and not available in open source as they are undoubtedly classified.

On the issue of the applicability of the timeframe of a net assessment beyond the four- to five-year timeframe typically found in strategic plan documents, DHS does not openly publish long-term strategies beyond this timeframe. Other than strategic plans and publications required by Congress, DHS does not produce a long-term strategic analysis. Any strategic plan created by DHS is usually constrained to a four-year timeframe. This thesis assumes that if a net assessment is conducted, it should project capabilities beyond this four- to five-year timeframe.

D. LITERATURE REVIEW

The literature review further discusses net assessment within the DOD and DHS. It also provides amplifying information referenced in the problem statement.

1. Introduction to and Defining Net Assessment

This thesis utilizes the DOD net assessment as its model. A review of publicly available information on DOD ONA was conducted. As much of what the ONA does is classified, very little public information is available on its publications and products. An example of a declassified DOD net assessment is included in the appendix.

In 1973, the National Security Council (NSC) tasked the DOD with the creation of a net assessment of U.S. versus Soviet ground forces.[7] According to declassified national security memoranda, the DOD ONA was tasked with defining net assessment and areas it would address, developing a net assessment methodology, and creating communications protocols for its reports.[8]

---

[7] Krepinevich and Watts, *The Last Warrior*, ch. 4.

[8] Henry Kissinger, "National Security Study Memorandum 178" (official memorandum, Washington, DC: Digital National Security Archive, 1973), http://search.proquest.com/dnsa/docview/1679072716/fulltextPDF/4B883ECD82974A3DPQ/12?accountid=12702.

Many scholars, such as Bracken, Schutte, and Skypek, consider Andrew Marshall as the "father" of DOD's modern net assessment process.[9] His 2015 retirement merited a front-page article in the *Washington Post*.[10] As such, Marshall's declassified memoranda on net assessment reveal that net assessment is defined more by its objectives rather than its methodology.

In his 1973 memorandum for the NSC, Marshall states that net assessments are "intended to provide insight for policymakers at the highest levels by discovering and illuminating the nature of major national security problems."[11] Marshall further explains that net assessments are used to define both this nation's own capabilities, as well as those of its adversaries by utilizing the highest levels of analysis. Net assessments should also focus on the analysis of the difference in capabilities rather than solutions to any capability gap.[12]

Marshall's net assessments attempt to answer the following questions:[13]

- Do we have a gap in our capability?
- If we do have a gap, how much is it?
- Is the gap increasing or decreasing?
- What are the causes of the gap?

---

[9] John M. Schutte, *Casting Net Assessment* (Maxwell Air Force Base, AL: Air University Press, Air Force Research Institute, 2015), xiii, http://www.au.af.mil/au/aupress/digital/pdf/paper/dp_0016_schutte_casting_net_assessment.pdf; Thomas M. Skypek, "Evaluating Military Balances through the Lens of Net Assessment: History and Application," *Journal of Military and Strategic Studies* 12, no. 2 (Winter 2010): 1–25, https://www.ciaonet.org/attachments/17550/uploads; Paul Bracken, "Net Assessment: A Practical Guide," *Parameters* 36, no. 4 (2006): 90–100, http://www.comw.org/qdr/fulltext/06bracken.pdf.

[10] Greg Jaffe, "Yoda's Replacement: Air Force Veteran to Lead Legendary Pentagon Office," *The Washington Post*, May 13, 2015, https://www.washingtonpost.com/news/checkpoint/wp/2015/05/13/yodas-replacement-air-force-veteran-to-lead-legendary-pentagon-office/?wprss=rss_national-security.

[11] Marshall, "National Net Assessment," 2.

[12] Marshall, 1.

[13] Marshall, 2.

The DOD continues to utilize the same simple criteria for its net assessments. Currently, the DOD defines net assessment as, "the comparative analysis of military, technological, political, economic, and other factors governing the relative military capability of nations. Its purpose is to identify problems and opportunities that deserve the attention of senior defense officials."[14] Bracken notes the importance of a net assessment analysis leads to decisive strategic advantage, especially when the information is widely known.[15] Bracken further elaborates upon this advantage by noting that net assessments are not simply comparisons based on rivalry, but also take into account the effects of the capabilities of allies and neutral, third parties.[16]

2. Justification for Homeland Security Net Assessment

Some government officials have called for DHS to establish an ONA. In a terrorism report, the Homeland Security Advisory Council recommended DHS create an ONA to analyze terrorism trends.[17] In 2008, the Homeland Security Advisory Council called for DHS to begin a net assessment in its final report on the Essential Technology Task Force.[18]

In 2004, Public Law 108-458 granted the Director of the National Counter Terrorism Center (NCTC) the authority to conduct net assessments. However, these net assessments are limited to terrorism issues.[19] To date, DHS has not established an ONA. In 2010, DHS defined net assessment as "multidisciplinary strategic assessment process used to provide a comparative evaluation of the balance of strengths and weaknesses."[20]

---

[14] Department of Defense, *Director of Net Assessment*.

[15] Bracken, "Net Assessment," 100.

[16] Bracken, 98.

[17] Homeland Security Advisory Council, *Future of Terrorism Task Force* (Washington, DC: Department of Homeland Security, 2007), 7, https://www.dhs.gov/sites/default/files/publications/hsac-future-terrorism-pres-011107.pdf.

[18] Homeland Security Advisory Council, *Essential Technology Task Force* (Washington, DC: Department of Homeland Security, 2008), 10, https://www.dhs.gov/sites/default/files/publications/hsac_dhs_ettf_report_update.pdf.

[19] Intelligence Reform and Terrorism Prevention Act of 2004, Public Law 108–458 (2004): 38, https://www.nctc.gov/docs/pl108_458.pdf.

[20] Risk Steering Committee, *DHS Risk Lexicon, 2010 Edition* (Washington, DC: Department of Homeland Security, 2010), 20, https://www.dhs.gov/xlibrary/assets/dhs-risk-lexicon-2010.pdf.

Since then, no other governing memoranda or policies cite homeland security net assessments.

Several scholars have written regarding the need for homeland security net assessments. Immediately after the establishment of DHS in 2003, Carafano and Heyman wrote for the need for a DHS ONA. They envisioned an independent office that would provide strategic advice to the Secretary and senior leadership across DHS components.[21]

Forrest and Hilliker note how a DHS ONA would provide policy and decision makers with valuable insight into future trends through the analysis of data rather than by basing strategy on history or homeland security related events.[22]

In supporting several of the aforementioned scholars' calls for a DHS ONA, Dahl reinforces the need for homeland security net assessment. His work stresses not only this nation's own capabilities, as well as those of its adversaries, but also includes the notion of the legitimacy of its capability. Historically, the DOD's net assessment model does not include a calculation for constitutional or civil liberties. Dahl proposes that a homeland security net assessment requires an analysis of threats, legitimacy, and capabilities in the areas of natural hazards, terrorism, and cyber threats.[23]

3. DHS Policy Overview

To propose the inputs, outputs, and audience for a homeland security net assessment, this section reviews DHS strategic policies to determine what should be the department's strategic priorities. Two primary resources are published by DHS regarding the strategic outlook and context for homeland security. These resources form the foundation for Chapter III in an overview of the DHS strategic planning process.

The DHS 2014 QHSR provides context as to DHS' priorities. For example, the QHSR lists six strategic threats to homeland security: terrorism, cyber threats, biological

[21] Heyman and Carafano, *DHS 2.0*, 12.

[22] Forrest and Hilliker, "Why the Department of Homeland Security Needs an Office of Net Assessment," 8.

[23] Dahl, "A Homeland Security Net Assessment Needed Now!," 69.

concerns, nuclear threats, criminal organizations, and natural hazards.[24] The QHSR also provides context for the strategic environment in which it operates.

The DHS 2014–2018 Strategic Plan provides strategic context more specific to DHS rather than the homeland security enterprise as a whole. The Strategic Plan sets priorities for DHS and its components in its direct missions, such as border security, air transportation security, and protecting critical infrastructure.[25]

E. RESEARCH DESIGN

1. Goal

This thesis utilizes policy analysis as structured by Bardach and Patashnik to create a notional homeland security net assessment model.[26] The objects of study are the DOD net assessment model and DHS strategic policies. Basic diagrams and models are created and used to illustrate frameworks and information flows into and out of the net assessment analysis function by using a simplified SE model for visualization. A notional DHS net assessment model example is created utilizing a DHS core function capability, net assessment framework, and the SE model for clarity.

2. Selection

For the object of study, open source information is used regarding the DOD net assessment model. The DOD net assessment model was selected since it is the example most commonly cited by scholars as most aligned with DHS strategic planning priorities. An SE model is utilized to conceptualize the net assessment framework. An SE model is composed of inputs, functions, and outputs. Applied to the net assessment process, this model can show how the strategic analysis is laid out.

---

[24] Department of Homeland Security, The 2014 Quadrennial Homeland Security Review, 28.

[25] Department of Homeland Security, *Fiscal Years 2014–2018 Strategic Plan* (Washington, DC: Department of Homeland Security, 2014), 6, https://www.dhs.gov/sites/default/files/publications/FY14-18%20Strategic%20Plan_0_0.PDF.

[26] Eugene Bardach and Eric M. Patashnik, A Practical Guide for Policy Analysis: The Eightfold Path to More Effective Problem Solving, 5th ed. (USA: CQ Press, 2015).

3. Data Sources

Data sources to be used for this thesis are mainly drawn from studies done on the DOD net assessment model because DHS does not conduct homeland security net assessments. DHS policies and strategic plans are also researched to find areas of concern for long-term homeland security issues. Scholarly articles written on the DOD net assessment framework and the need for DHS to conduct net assessment are also utilized for this thesis.

4. Thesis Framework

This thesis concentrates on the net assessment model itself. Through policy analysis, the thesis presents the idea of net assessment similar to a simplified SE model consisting of input nodes of information, a calculation function, and outputs of the results. The thesis specifically focuses on the following listed main areas.

In Chapter II, an SE model is introduced as the foundation for a net assessment model. The DOD net assessment model framework is also analyzed. The DOD model serves as a template for a DHS net assessment model. Utilizing available information about the DOD net assessment model, a strategic analysis framework is created. This framework is used and modified later in the thesis to fit within DHS strategic goals.

In Chapter III, the DHS strategic plans and policies are analyzed. The purpose of this analysis is to identify areas of concern to DHS for its long-term strategic outlook. DHS strategic policy documents provide a viewpoint into future threats to homeland security. They also show how DHS will address those threats. These documents provide the strategic information that can be inserted into the modified DOD net assessment framework to provide a homeland security net assessment.

Utilizing the DOD net assessment framework and the DHS strategic capability information, a DHS net assessment model is created in Chapter IV. Any deficiencies in the DOD net assessment are identified as modifications necessary for a DHS net assessment. For example, the DOD net assessment framework may require modifications for a strategic analysis on natural disaster response capability since that falls outside of DOD's primary mission.

The inputs for the model are listed based on the strategic priorities of DHS. The thesis explores areas and information that feed into the model through a policy analysis of DHS strategic doctrine. For example, by conducting a "natural disaster resiliency" net assessment, forecasted weather patterns, or global warming trends may comprise information given for threat capabilities.

Within the net assessment framework, an analysis is conducted on the central function of the net assessment. Open source information and scholarly articles are researched to create a conceptual function for the input information resulting in the net assessment output. To assist with the framework, diagrams and drawings are created to enhance the framework's narrative.

The proposed DHS net assessment model identifies the nation's homeland security problems or gaps in capabilities. These problems and gaps are outputs of the model. Net assessment also determines the size (i.e., how bad is it?) and trend of the problem (i.e., is the problem getting worse?) Specifically, the output information is tied into long-term DHS strategic concerns to identify shortcomings against adversaries or natural disasters. Utilizing policy analysis, a potential audience for the products of the net assessment is identified.

A notional DHS net assessment is presented in Chapter V. A DHS strategic capability (such as pandemic disaster response) is selected. Current DHS capability and current threats are inputted into the framework. The capabilities then undergo a strategic net assessment analysis. Outputs are calculated based on the researched function. This thesis concludes with findings and suggestions for further research. For the reader's reference, a declassified example of a DOD net assessment is included as an attachment to this thesis.

II. SE MODEL AND ANALYSIS OF THE DOD NET ASSESSMENT FRAMEWORK

> Thus, when making a comparative evaluation through estimations to seek out its true nature, ask the following questions:
>
> - Which ruler has the Tao?
> - Which general has greater ability?
> - Who has gained [the advantages of] Heaven and Earth?
> - Whose laws and orders are more thoroughly implemented?
> - Whose forces are stronger?
> - Whose officers and troops are better trained?
> - Whose rewards and punishments are clearer?
>
> From these I will know victory and defeat.
>
> ~ Sun Tzu, *The Art of War*[27]

This chapter describes and presents a generic systems engineering (SE) model. The purpose of the systems engineering model is to create a visual framework for an analysis process. Then, the SE model is tailored to strategic policy and a strategic capability analysis. Next, net assessment analysis is introduced and its purpose is explained. Finally, the model for net assessment analysis is discussed.

A. SE AND SE MODEL

In this section, SE and an SE model are introduced to help conceptualize the net assessment model. Systems are defined as separate elements that when combined yield outcomes not possible if the elements were analyzed individually. Elements can be comprised of personnel, parts, software, data, buildings, or policies.[28] An example of a complex system would be a commercial aircraft composed of numerous flight systems, software, facilities that support maintenance, policies that regulate maintenance, and personnel to maintain and fly the aircraft.

---

[27] Sun Tzu, *The Art of War*, trans. Ralph D. Sawyer (Boulder, CO: Westview Press, 1994), 167–168.

[28] "What is Systems Engineering?" International Council on Systems Engineering, accessed February 18, 2018, https://www.incose.org/AboutSE/WhatIsSE.

SE is a method to model simple to complex interactions, usually in a technical environment, whereby a product is created. It models the entire problem and multiple variables, and calculates the results on the system as a whole when something is changed. Specific focus is given to modeling the system's behavior and reducing unfavorable ramifications when one part of a system disrupts the system as a whole.[29] For example, SE is typically utilized during the design of commercial aircraft.[30] If the designers decided to integrate a new flight control system, SE would calculate and account for the effect the new system would have on all other systems.

The International Council on Systems Engineering (INCOSE) created a context diagram for the SE process, as shown in Figure 1.

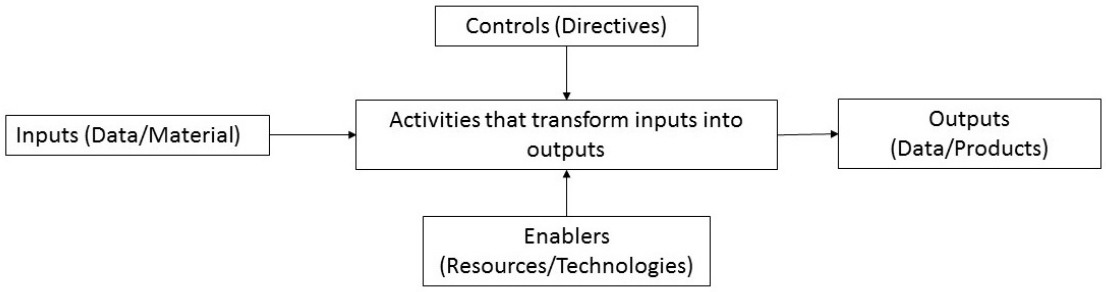


Figure 1. Context Diagram for Systems Engineering (SE) Process.[31]

In this model, each box represents an input, function, or output. Inputs into a system can be material, data, or a combination of both.

NCOSE defines activities as "set of actions that consume time and resources and whose performance is necessary to achieve…outcomes." INCOSE further defines enablers as the tools, resources, or technologies used to carry out the activity. Controls are defined

[29] Cecelia Haskins et al., eds. *Systems Engineering Handbook: A Guide for System Life Cycle Processes and Activities*, v 3.1 ed. (San Diego: International Council on Systems Engineering, 2007), 2.1.

[30] Haskins et al., 2.4.

[31] Source: Haskins et al., 1.4.

as the policies, constraints, and directives that influence the activity. Outputs are the final data, service, or product that is the result of carrying out the activity.[32]

As an example, suppose this SE model is utilized in building a home. When an architect is designing a home, homeowners provide input as to the type of house they wish to have built and the general contractor will provide material with which to construct the house. The activity is the construction of the home and the oversight of the construction workers to ensure the home is built to the design. The enablers are the tools, workers, electrical power, and other needed infrastructure to carry out the construction. Controls are engineering standards and building codes that influence how the home is designed and built. The final output of the process is the finished home.

B. APPLICABILITY TO STRATEGIC POLICY AND CAPABILITY ANALYSIS

The SE model and discipline is utilized for both managerial and technical processes.[33] SE can be used to model processes that are not technical in nature, such as resource management, human/system interface, policy, regulations, decision making, quality management, requirements management, and human error.[34] As seen in Figure 2, the SE model given in the previous section provides a framework to visualize an analytic process.

[32] Haskins et al., 1.4.

[33] Haskins et al., 2.2.

[34] Haskins et al., 1.2.

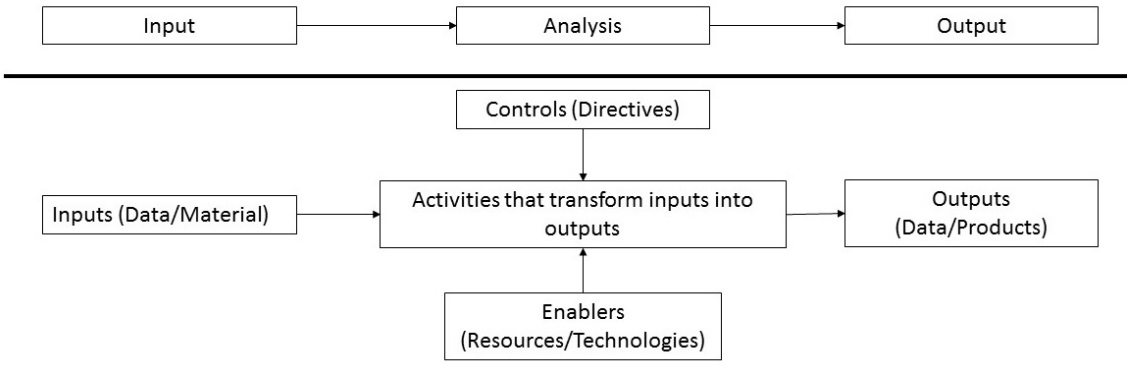


Figure 2. Systems Engineering Model as Analytical Process

For strategic policy or capability analysis, the model can be simplified as input → analysis → output as applied to the decision-making or capability analytic processes. Within the context of policy or capability analysis, controls and enablers might vary depending on the conditions of the analysis. These controls and enablers within the SE model are beyond the scope of this thesis, as it focuses upon a single type of analysis, net assessment. The net assessment model does not explicitly utilize controls and enablers within its framework. See Figure 3.

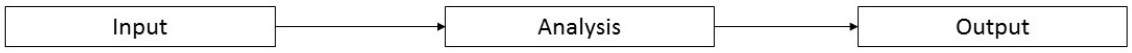


Figure 3. Simplified SE Model for Conducting Analysis

C. DEFINITION AND USAGE OF NET ASSESSMENT

According to the DOD, net assessment "is defined as the comparative analysis of military, technological, political, economic, and other factors governing the relative military capability of nations. Its purpose is to identify problems and opportunities that deserve the attention of senior defense officials."[35] Skypek notes that the net assessment

[35] Department of Defense, *Director of Net Assessment*, 2.

model assumes that these nations are in competition with each other. This model would not be valid when comparing joint or allied capabilities. Skypek also states how net assessment is used to educate policy makers in strategic opportunities and are usually functional (e.g., nuclear arsenal) or geographical (e.g., South East Asia maritime region).[36]

As discussed in Chapter I's literature review, Andrew Marshall is considered by many scholars as the father of the modern net assessment process. In his declassified NSC memorandum, Marshall explains that the net assessment process should be both "a comparison between the U.S. and some rival nation" and "the most comprehensive form of analysis in the hierarchy of analysis."[37] Marshall further posits that net assessment focuses on the root causes of the difference in capability rather than provide solutions as "diagnosis" based.[38]

The net assessment model is not a pure mathematical model, such as that employed by operations research and other mathematics heavy analysis. Marshall (as cited by Schutte) notes that net assessment is a deliberate change in direction from the systems analysis favored by strategic planners and think tanks. Net assessment looks for not only capability gaps, but also places where the United States has a comparative advantage over its adversaries.[39]

The net assessment framework is designed to be flexible depending on the type of capability being assessed. Trends are an important part of net assessment, as well as raw numbers, such as force numbers and expenditures. Watts (as cited by Schutte) notes that net assessments are almost impossible to reduce to a formula.[40] As such, the DOD framework discussed as follows is not a hard or rigid model that cannot be modified. Rather, the analyst has the flexibility to add or remove factors in the input and analysis that give the best results.

---

[36] Skypek, "Evaluating," 3.

[37] Marshall, "National Net Assessment," 1.

[38] Marshall, 1.

[39] Schutte, Casting Net Assessment, 75.

[40] Schutte, 82.

D. INPUTS, FUNCTIONS, AND OUTPUTS OF THE DOD NET ASSESSMENT MODEL

1. Inputs

The inputs (Figure 4) of the DOD net assessment model may change depending on the type of strategic analysis desired. Marshall notes that net assessment may be conducted on all types of areas, such as technology, economy, and political issues in addition to military capabilities.[41] Cohen states that most of the information used in DOD net assessments is classified. This information includes this nation's (blue) force capabilities, as well as the best intelligence estimates on the capabilities of an adversary's (red) force capabilities. Cohen (as cited by Skypek) states that the inputs into a strategic net assessment are going to vary according to the area assessed.

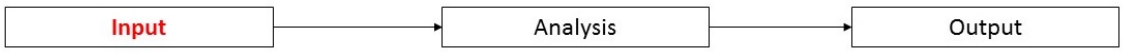


Figure 4. Simplified Systems Engineering Model for Conducting Analysis—Input

2. Analysis

Cohen also gives four basic categories of information used as functions of analysis into the net assessment framework.[42] (See Figure 5).

Figure 5. Simplified Systems Engineering Model for Conducting Analysis—Analysis

[41] Marshall, "National Net Assessment," 2.

[42] Skypek, "Evaluating," 7.

a. Trend Analysis

Trend analysis is typically conducted on long-term budget outlays on military platforms and weapons. Extrapolation of long-term acquisitions on these weapons and their subcomponents on both blue and red forces opens a window into how those weapons systems are developed, operated, deployed, and maintained.[43]

b. Doctrine

Skypek notes that doctrine involves the information regarding a state's goals, threats, the reasons why a state may go to war, and its tactics in deploying its forces in an armed conflict.[44]

c. Strategic Asymmetries

This input focuses on the "areas of competitive advantage" between two countries. In comparing two countries' capabilities, one country may have a distinct advantage in the cyber domain, but its rival may have advanced capabilities in land and naval capability.[45]

d. Scenarios

Using scenarios, analysts can test their predictions. The DOD ONA uses long-term scenarios to see how capability balances evolve over the course of 20 plus years. Wargaming is often used for this long-term projection.

3. Output

a. DOD Net Assessment Model Outputs

For the outputs of the net assessment analysis model (Figure 6), Marshall's net assessment analysis provides the answers to these questions:[46]

---

[43] Skypek, 8.

[44] Skypek, 8.

[45] Skypek, 8.

[46] Marshall, "National Net Assessment," 2.

- Is there a problem in our capability?
- What is the size of that problem or capability gap?
- What is the trend of that problem or capability gap? (i.e., is it getting better or worse?)
- What is causing this problem or capability gap?

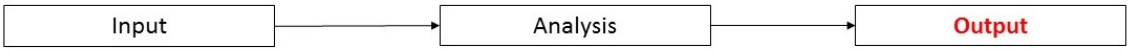


Figure 6. Simplified Systems Engineering Model for Conducting Analysis—Ouput

For the DOD net assessment model, the answers to these questions are considered as the final output of the analysis.

As an example, as shown in Figure 7, Skypek provides the following outline for a net assessment analysis.

Figure 7. Notional Outline of a Net Assessment.[47]

The important part of a net assessment is that the information used is going to change depending on the area being analyzed. A single framework does not exist for all strategic analyses. Marshall notes that both blue and red force capabilities should be analyzed "side by side" and that elaborate modeling should be avoided in net assessments.[48]

E. DOD NET ASSESSMENT FRAMEWORK MODELED AS A SYSTEM

Once these inputs have been provided, functions and outputs as detailed in this chapter can be placed into the simplified SE model as detailed previously in this chapter. This model seen in Figure 8 shows a visual representation of the DOD net assessment framework.

[47] Source: Skypek, "Evaluating," 9.

[48] Marshall, "National Net Assessment," 5.

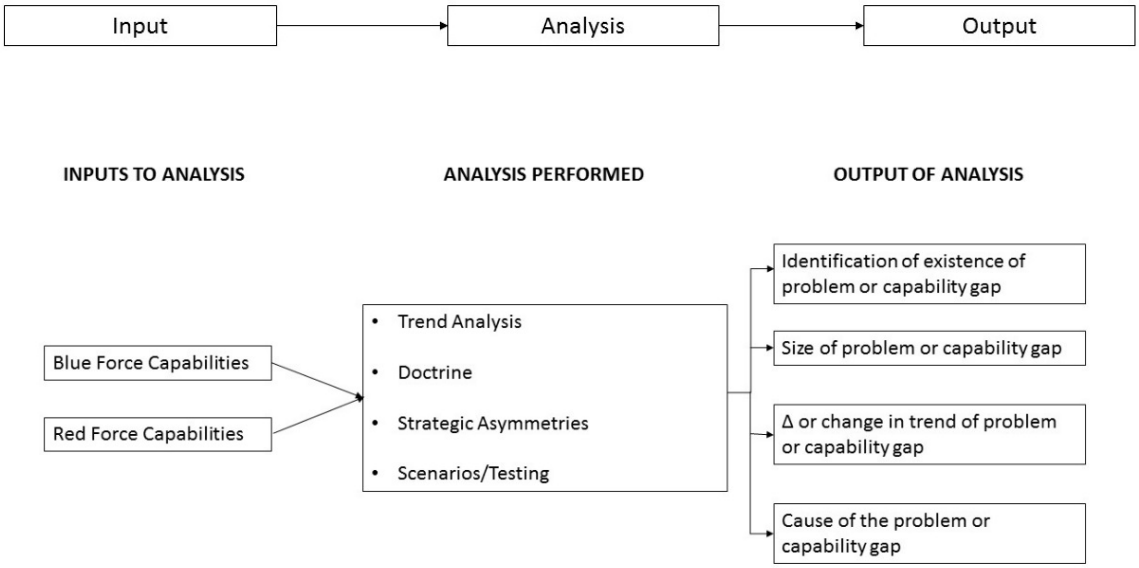


Figure 8. DOD Net Assessment Model

This flexible DOD net assessment model serves as the template for developing a net assessment framework for DHS in Chapter IV.

III. DHS STRATEGIC PRIORITIES

> The homeland security strategic environment is constantly evolving, and while we have made significant progress, threats from terrorism continue to persist. Today's threats are not limited to any one individual or group, are not defined or contained by international borders, and are not limited to any single ideology…[these trends] suggest new opportunities and challenges that must be accounted for in our current and longer-term homeland security strategic planning.
>
> ~ DHS Deputy Assistant Secretary for Policy Alan Cohn in testimony before Congress.[49]

This chapter explores DHS strategic priorities as set out in its organization and publications. To determine how to model long-term DHS strategic planning, it is first necessary to look to DHS' strategic domains and concerns. Once they are determined, these concerns and domains determine the type of inputs, analysis, and outputs for the net assessment model.

A. INTRODUCTION TO DHS STRATEGY

The Assistant Secretary of Policy, Office of Policy controls the strategic analysis and policy development within DHS. Within the Office of Policy, the Office of the Assistant Secretary, Strategy, Plans, Analysis & Risk (SPAR) controls the development of DHS strategy documents.[50] SPAR creates the two main documents that detail DHS' long-term strategic planning, the QHSR and the DHS Strategic Plan.[51] These two documents serve as the basis in determining DHS' strategic priorities, plans, and areas of focus.

---

[49] "Testimony of Alan Cohn, Policy's Deputy Assistant Secretary for the Office of Strategic Plans, before the House Committee on Homeland Security, Subcommittee on Oversight, Investigations, and Management regarding How DHS is Implementing a Strategy to Counter Emerging Threats," Department of Homeland Security, last published date July 31, 2017, https://www.dhs.gov/news/2012/02/02/testimony-alan-cohn-policys-deputy-assistant-secretary-office-strategic-plans-house.

[50] "Mission," Department of Homeland Security, last published date January 21, 2020, https://www.dhs.gov/office-policy.

[51] "Strategy, Plans, Analysis & Risk," Department of Homeland Security, last published date September 20, 2019, https://www.dhs.gov/strategy-plans-analysis-risk.

The most recent DHS QHSR was published in fiscal year (FY) 2014 and covers FY 2014–2018.[52] According to the DHS QHSR, it is published every four years. The requirement for DHS to publish the QHSR is codified in Public Law 107-296, the Homeland Security Act of 2002, and Public Law 110-53, Implementing Recommendations of the 9/11 Commission Act of 2007.[53] The purpose of the QHSR is to "be a comprehensive examination of the homeland security strategy of the Nation, including recommendations regarding the long term strategy and priorities of the Nation for homeland security and guidance on the programs, assets, capabilities, budget, policies, and authorities of the Department."[54]

Through legislation, Congress requires that DHS review the following areas related to homeland security every four years and publish the results:[55]

- Describe and update the nation's strategy for homeland security.
- Delineate the mission areas that are critical to national homeland security.
- List the preparedness, financial plan, collaboration between agencies, and infrastructure that support the mission areas and strategies defines in the first two areas.
- Develop a plan for a comprehensive budge to support the strategy and missions of the nation's homeland security plan.
- Evaluate the organizational model of the Department in accordance with the missions and strategic priorities.
- Measure the efficiency of the Department's efforts to execute the budget plan in accordance with the strategic priorities and mission areas.

[52] Department of Homeland Security, The 2014 Quadrennial Homeland Security Review, 11–12.

[53] Department of Homeland Security, 11.

[54] Department of Homeland Security, 11.

[55] Department of Homeland Security, 11–12.

Following the creation of the QHSR, the DHS Strategic Plan delineates how the department will execute the strategic plan and spend the money allocated by Congress in support of the QHSR. The requirement for DHS to publish a strategic plan is codified by Public Law 111-352, the GRPA Modernization Act of 2010, and the Office of Management and Budget (OMB)'s 2013 Circular A-11, Part 6.[56]

The most recent DHS Strategic Plan was published in FY 2014 and covers years FY 2014–2018, which correlated with the same timeframe of the QHSR.[57] The QHSR can be thought of as answering the "who, what, when, where, and why" of the homeland security mission and strategic concerns. The Strategic Plan then answers the "how" as to DHS plans to meet those strategic goals and comply with its missions.

B. ANALYSIS OF DHS' STRATEGIC DOCUMENTS FOR "BLUE FORCE" CAPABILITIES

As detailed in the previous chapter, the DOD net assessment model is based on comparing this nation's capabilities with that of its adversaries. By looking at the QHSR, it is possible to determine whom DHS considers as its adversaries, as well as its own capabilities to counteract those adverse conditions or actors. First, DHS' mission areas are reviewed. These mission areas determine what DHS considers to be its primary focus in its capabilities.

According to the 2014 QHSR, DHS considers the following five areas as its strategic priorities.[58]

1. Prevent Terrorism and Enhance Security

DHS defines this core mission as the ability to "anticipate, detect, target, and disrupt threats that challenge national security, economic prosperity, and public safety."[59] DHS' "blue force" capability is defined as the ability to disrupt these terrorism threats.

---

[56] Department of Homeland Security, *Fiscal Years 2014–2018 Strategic Plan*, 3.

[57] During the final completion of this thesis, DHS released a new strategic plan for FY 2020-2024. Due to the lateness of its release, it was not included in this analysis.

[58] Department of Homeland Security, The 2014 Quadrennial Homeland Security Review, 11.

[59] Department of Homeland Security, 33–34.

2. Secure and Manage U.S. Borders

This mission area is divided into two main foci. First, it is regulating the flow of goods and products across the U.S. borders through inspection and security of the pathways through which these products flow. It focuses on the import and export of legal goods while excluding illegal items, such as contraband, restricted technology, and illegal cash flows in and out of U.S. borders. Secondly, it concentrates on the security of people who transit across U.S. borders through land, air, and sea pathways. DHS focuses on stopping those who wish to harm U.S. citizens, such as terrorists and criminals and human trafficking, and protecting the rights of those who visit and immigrate legally.[60] DHS' capability in this area is its ability to regulate and defend goods and people in these arenas.

3. Enforce and Administer our Immigration Laws

DHS efforts in this strategic mission are to administer immigration law as it pertains to residency, immigration, and deportation. DHS also focuses on reducing the incentive for companies to hire undocumented immigrants.[61] Blue force capability in this strategic mission can be defined as DHS' ability to enforce immigration law and policy.

4. Safeguard and Secure Cyberspace

DHS defines this mission as the ability to detect, prevent, and investigate threats to the nation's cyber-based infrastructure that includes cybercrimes, such as child pornography, financial fraud, and intellectual property (IP) theft, as well as cyber-attacks against physical infrastructure systems, such as building control systems and essential services to include power, water, and transportation sectors.[62] DHS' capabilities in this mission are defined as its ability to disrupt, prevent, and investigate these threats.

---

[60] Department of Homeland Security, 53–59.

[61] Department of Homeland Security, 7.

[62] Department of Homeland Security, 39–40.

5. Strengthen National Preparedness and Resilience

DHS defines this strategic mission as this nation's ability to safeguard against and respond to both manmade hazards, such as nuclear terrorism and cyber-attacks, as well as natural disasters.[63] DHS also defines this mission as identifying, preventing, and responding to various biological threats like advanced diseases, such as smallpox and anthrax, diseases with the potential for a pandemic, animal and plant diseases that are very disruptive, such as mad cow disease, and the intentional contamination of water and food supplies with toxins or disease.[64] DHS' and its enterprise partners' capability in this mission area is defined as preventing and responding to these threats.

C. ANALYSIS OF DHS' THREATS OR "RED FORCE" CAPABILITIES

This section analyses the strategic plan to evaluate the threats to the DHS strategic mission. The Strategic Plan provides the structure for how DHS and its homeland security enterprise partners will meet its stated mission goals. Each of the five mission areas listed in the strategic plan was observed to establish a list of common threats or challenges against the "blue force" capability. As the net assessment model depends on a comparison between adversaries, some mission areas may not have an adversary or one type of adversary may be common to several mission areas.

The five mission areas are carried over from the 2014 QHSR into the 2014 Strategic Plan. Each area was analyzed to create a list of adversaries in accordance with the DOD net assessment framework noted in the previous chapter and blue force capabilities as listed in the previous section. They are detailed as follows.

1. Prevent Terrorism and Enhance Security

Terrorism is the primary adversary under this mission area in the Strategic Plan. DHS' terrorism adversaries include independent actors, radicalized individuals, and recognized international and domestic terrorism groups.[65] Secondary to terrorism, DHS'

[63] Department of Homeland Security, 71.

[64] Department of Homeland Security, 47.

[65] Department of Homeland Security, *Fiscal Years 2014–2018 Strategic Plan*, 15.

also lists criminal actors in both physical and cyber-attacks against U.S. information, infrastructure, national special security events (NSSE), government leaders, and facilities.[66]

2. Secure and Manage U.S. Borders

The primary adversary to DHS' capability in this arena stems from transnational organized crime. Organized transnational criminals are responsible for smuggling illegal goods into and out of U.S. borders, such as firearms, drugs, money, and counterfeit goods. Organized transnational criminals are also responsible for human trafficking and smuggling undocumented immigrants across U.S. borders.[67]

3. Enforce and Administer U.S. Immigration Laws

This mission area focuses on DHS' ability to carry out immigration laws and judicial orders to include enforcement of visas and deportation orders. Within this strategic mission, DHS does not list any specific adversary. However, to fulfill this mission, DHS does identify that anti-fraud and counterfeiting efforts are required in the areas of visa and immigration documentation and the need for DHS to collect and inventory biometric information.[68] One potential adversary may be organized transnational criminals who provide fraudulent documents to circumvent immigration laws.

4. Safeguard and Secure Cyberspace

DHS lists cybercriminals as the primary adversary to meeting this strategic mission. Cybercriminals' goals may be financial gain (such as hacking into a bank), theft of information, or penetration a protected system for the challenge.

Since the Strategic Plan was published in 2014, two significant cyber-attacks are tied to nation states rather than individuals or criminal organizations. In 2015, it was revealed that hackers exfiltrated over 21 million background investigations, over four

[66] Department of Homeland Security, 18.

[67] Department of Homeland Security, 20–24.

[68] Department of Homeland Security, 26–27.

million personnel files, and over five million fingerprint files on federal employees and contractors who held security clearances from Office of Personnel Management (OPM).[69] While no official, unclassified report from the U.S. government has been released as to the identity of the hackers, it is widely reported in the media that a Chinese military unit is responsible for the attack.[70]

Another major incident that has occurred since 2014 is the 2016 election hack attributed to Russian government hackers. In this incident, sensitive information was exfiltrated from the Democratic National Committee's servers and released to the public. In this instance, the U.S. government directly accused the Russian government of carrying out this cyber-attack.[71]

Given these two events, it can be argued that while cyber-attacks carried out by nation states were expected in the frame of intelligence collection activities, these events show how the theft of non-classified information from government and private servers can affect the U.S. homeland security enterprise. This theft can give rise to nation-states as cybercriminals or cyber attackers whose goals are to weaken this country's government through the exploitation of information.

5. Strengthen National Preparedness and Resilience

This mission area is mostly focused on the prevention and response to manmade and natural events or hazards. DHS delineates the adversaries in this mission area as accidents, deliberate attacks, and natural disasters.[72] Domestic or international terrorists, individual actors, or criminal organizations can carry out attacks. The 2014 QHSR

---

[69] Committee on Oversight and Government Reform, *The OPM Data Breach: How the Government Jeopardized our National Security for More than a Generation* (Washington, DC: U.S. House of Representatives, 114th Congress, 2016), v.

[70] Brendan I. Koerner, "Inside the Cyberattack that Shocked the U.S. Government," Wired Magazine, October 23, 2016, https://www.wired.com/2016/10/inside-cyberattack-shocked-us-government/.

[71] "Joint Statement from the Department of Homeland Security and Office of the Director of National Intelligence on Election Security," Department of Homeland Security, October 7, 2016, https://www.dhs.gov/news/2016/10/07/joint-statement-department-homeland-security-and-office-director-national.

[72] Department of Homeland Security, *Fiscal Years 2014–2018 Strategic Plan*, 35.

identifies pandemics and climate change as two adverse actors in this mission realm.[73] While not a human actor, emerging diseases or increased weather events caused by climate change can fit into the net assessment framework as an adversary.

Distilling these adversaries into a consolidated list shows this nation's adversaries as defined by the DOD net assessment framework. Threats that do not exist as a true adversary are excluded, as they do not fit within the net assessment model. An example is the threat of accidents resulting in a man-made disaster, such as a major hazardous material release as a result of an accident in a chemical plant.

The following list represents the highest hierarchical level of adversary rather than a comprehensive list of all existing adversaries.

- International terrorist groups
- Domestic terrorist groups
- Organized criminal groups
- Individual actors
- Natural disasters
- Cybercriminals, individual
- Cybercriminals, organized (terrorism or criminal)
- Cybercriminals, nation state sponsored
- Diseases and pandemics

This list of adversaries combined with the list of blue force capabilities against these threats is utilized as inputs in the next chapter to develop a DHS net assessment model utilizing the DOD net assessment framework.

[73] Department of Homeland Security, The 2014 Quadrennial Homeland Security Review, 21.

IV. DHS NET ASSESSMENT FRAMEWORK

> The range of existing threats and crises already facing the U.S. leaves the homeland security community with little time to prepare for threats that have not materialized. Rather than focusing on current threats and responses, the primary role of the ONA [DHS Office of Net Assessment] would be to provide the Secretary with comprehensive analysis of future threats and U.S. capabilities to meet those threats. The ONA would fill the much-needed role of producing long-term assessments and strategy, acting as a brain trust of creativity and imagination.
>
> ~ Future of Terrorism Task Force, Homeland Security Advisory Council[74]

In Chapter II, a generic DOD net assessment framework was proposed for usage in a DHS net assessment strategic analysis. In this chapter, the DOD framework is tailored for DHS strategic priorities and mission areas, as shown in Figure 9.

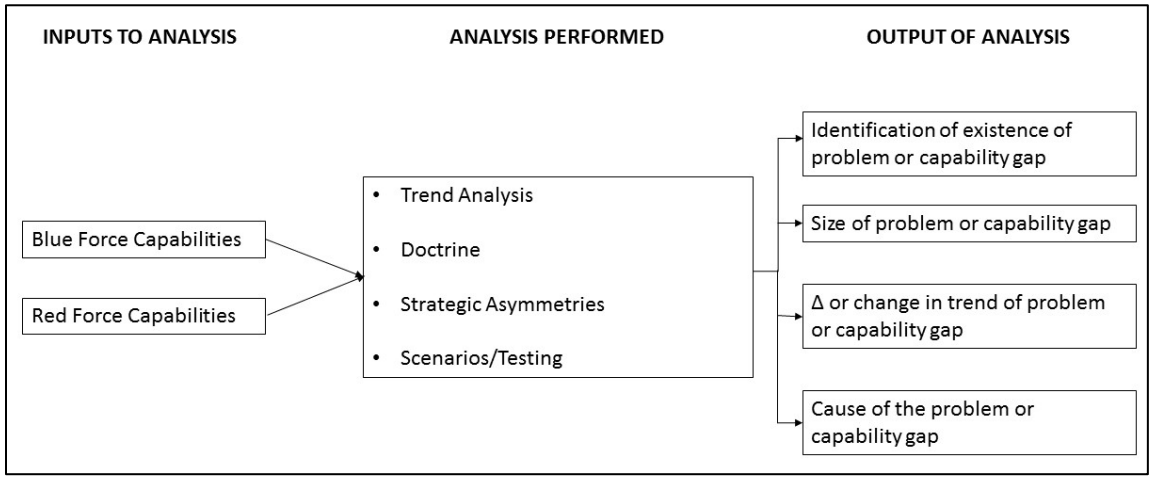


Figure 9. Net Assessment Model—DHS Strategic Priorities and Mission Areas

[74] Homeland Security Advisory Council, *Report of the Future of Terrorism Task Force* (Washington, DC: Department of Homeland Security, 2007), 6–7.

In each of these areas (inputs, analysis, outputs), the DOD framework is modified to account for desired DHS net assessment models as proposed by experts and scholars.

A. LIST OF PROPOSED INPUTS INTO A DHS NET ASSESSMENT FRAMEWORK

To evaluate the proposed model, each portion of the model is evaluated. Figure 10 shows the section of the DHS net assessment framework for the inputs into the model. These inputs are described in this section and focus on capabilities.

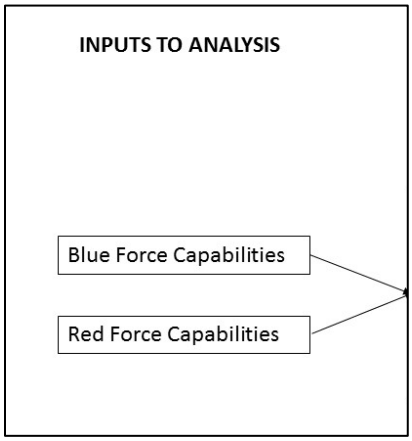


Figure 10. Net Assessment Model Inputs

1. Blue Force Capabilities

The desired inputs into a DHS net assessment model would obviously include the capabilities of DHS and its subcomponents within each of the five mission areas discussed in Chapter III.[75]

- Prevent terrorism and enhance security
- Secure and manage U.S. borders
- Enforce and administer U.S. immigration laws

[75] Department of Homeland Security, The 2014 Quadrennial Homeland Security Review, 14.

- Safeguard and secure cyberspace
- Strengthen national preparedness and resilience

However, DHS notes in its strategic publications that it relies heavily upon partnerships with other federal agencies, state/local/tribal partners, academic institutions, non-governmental organizations (such as the Red Cross), and the private sector to defend the United States against homeland security threats.[76] The capabilities of these non-DHS entities should be accounted for within these mission areas in a DHS net assessment as applicable.

For example, a net assessment on DHS' ability in the enforcement and administration of immigration laws mission may lie mostly within the DHS organization among the U.S. Coast Guard (USCG), U.S. Customs and Border Protection (CPB), U.S. Citizenship and Immigration Services (USCIS), and U.S. Immigrations and Customs Enforcement (ICE). Each agency contributes to DHS' overall capabilities within this mission. Other federal agencies may also contribute some (such as the State Department's actions against counterfeit immigration visas), as well as local law enforcement agencies to immigration or anti-human trafficking task forces. Depending on their impact, these contributions may or may not be significant enough to consider for blue force capabilities in a net assessment.

Other mission areas rely more heavily upon non-DHS entities' contributions to the mission capability. The mission area of strengthen national preparedness and resilience under the context of natural disasters relies heavily upon the capabilities of DHS components, such as the Federal Emergency Management Agency (FEMA). In addition, state and local emergency management agencies, National Guard units, non-governmental organizations, such as the Red Cross, private sector and individual communities, multiply the homeland security enterprise's efforts to respond to natural disasters. The blue force capabilities in this regard are much more inclusive.

[76] Department of Homeland Security, The 2014 Quadrennial Homeland Security Review, 8.

These questions guide the analyst in accounting for contributors to DHS' blue force capabilities in these mission areas.

- What is the definition of the scope of this mission area? What are the assets required to prevent, detect, investigate, mitigate, and respond to incidents within this mission area?
- What DHS entities and subcomponents contribute significant capability in this mission area? (Much of this information can be found within the DHS Strategic Plan and QHSR.)
- What other governmental (foreign/federal/state/local/tribal) organizations contribute toward this nation's capability in this mission area?
- What non-governmental organizations, such as private sector partners, academic institutions, and research partnerships, contribute to significant capability in this mission area?

By answering these questions, a net assessor can determine the scope of the information and intelligence of blue force capability.

2. Red Force Capabilities

In Chapter III, several adversaries were identified for each of the DHS mission areas. Similar to the Blue Force capability analysis, these adversaries may appear in multiple mission areas and several may appear within one mission area.

- International terrorist groups
- Domestic terrorist groups
- Organized criminal groups
- Individual actors
- Natural disasters

- Cybercriminals, individual
- Cybercriminals, organized (terrorism or criminal)
- Cybercriminals, nation state sponsored
- Diseases and pandemics

For example, organized criminal groups are significant adversaries in DHS border operations, human smuggling, human trafficking, cyber-attacks, trafficking of contraband, importation of counterfeit goods, and the illegal export of firearms and cash to other countries. On the contrary, natural disasters as an adversary may only appear within a net assessment of the DHS mission to strengthen national preparedness and resilience.

To account for the red force capability properly, the DHS net assessors should ask themselves three questions:

- Who (or what) is actively working against DHS within the mission area?
- Is this actor a true adversary as defined by the DOD net assessment model? (It may preclude accidents as an adversary.)
- What is that adversary's capability to defeat DHS efforts in this mission area?

The answers to these questions assist the net assessors in the scope of the red force analysis, as well as define the intelligence and information required to conduct a complete net assessment.

B. DHS TAILORING OF ANALYSIS PERFORMED

In Chapter II, the following analysis framework (Figure 11) was proposed from the DOD net assessment model.

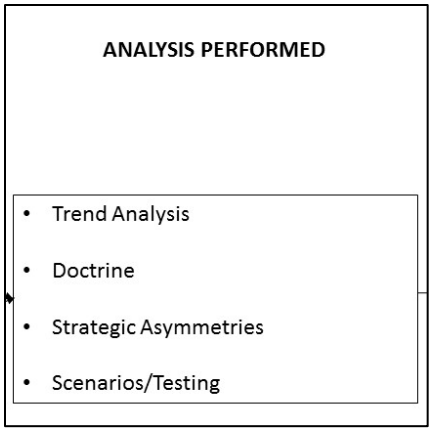


Figure 11. Net Assessment Model Analysis

For each of these types of analysis, the DOD model should be tailored to account for the environment within which DHS operates.

1. Trend Analysis

Numerous factors affect the capability trends within this analysis. As the DOD net assessment framework is a flexible model, the DHS net assessor should modify these trends to account for factors that will influence capabilities of both the blue and red forces. Within the DOD net assessment framework, Skypek notes the importance of long-term acquisition and budgets as a significant trend factor on blue and red force capabilities.[77]

Technology trends should also be considered as a major factor in trend analysis. For example, Wilson, Szechtman, and Atkinson note how the development and deployment of advanced sensors and unmanned aerial vehicles (UAV) along the U.S. borders and in military operating theatres has contributed to significant advances in detecting illegal activity.[78]

However, technology trends should also be considered as a positive factor in red force capability. For example, the Whisper encrypted messaging app is considered by many

[77] Skypek, "Evaluating," 7.

[78] Kurt E. Wilson, Roberto Szechtman, and Michael P. Atkinson, *A Sequential Perspective on Searching for Static Targets* (Amsterdam, Netherlands: Elsevier, 2011), 1, https://www.hsdl.org/?view&did=696971.

experts to be unbreakable by government agencies.[79] A recent federal subpoena of information from Whisper failed to provide any meaningful information.[80] Usage of this mobile phone app can possibly preclude government agencies from intercepting communications between terrorist or criminal groups.

Another interesting trend not accounted for in the DOD net assessment model is the idea of the legality of more sophisticated blue force techniques and capabilities. Congress controls DOD capabilities and acquisitions. These DOD acquisitions, for the most part, are not subjected to legal review or court actions (other than contractual legal review, such as the recent protest of the new B-21 bomber).[81]

The revelations of Edward Snowden on the National Security Agency's classified programs of intercepting communications of Americans both internationally and domestically resulted in a widespread call for more oversight and restriction on government surveillance.[82] Dahl defines this legal trend as the *legitimacy* of a nation's blue force capability. He further states, "[A]re the capabilities our government has developed to keep us safe seen as legitimate in the eyes of the people they are designed to serve?"[83]

As part of the trend analysis, a DHS net assessment should include, at a minimum, budget trends, technology trends, and legal or legitimacy trends for blue and red force capabilities. Other trends, such as climate change, should also be included when conducting a trend analysis of natural disasters or hazards.

---

[79] Andy Greenburg, "Encryption App 'Signal' Fights Censorship with a Clever Workaround," Wired Magazine, December 21, 2016, https://www.wired.com/2016/12/encryption-app-signal-fights-censorship-clever-workaround/.

[80] Brian Fagioli, "Open Whisper Systems Defeats Government Subpoena of Signal Data with Encryption," BetaNews, October 5, 2016, http://betanews.com/2016/10/05/open-whisper-systems-government-subpoena-signal-data-encryption/.

[81] Marina Malenic, "Northrop Grumman Resumes LRS-B Work after GAO Dismisses Boeing Protest," *Jane's Defence Weekly*, sec. 53, February 17, 2016, http://search.proquest.com/docview/1765499395.

[82] Paul Szoldra, "This is Everything Edward Snowden Revealed in One Year of Unprecedented Top-Secret Leaks," Business Insider, September 16, 2016, http://www.businessinsider.com/snowden-leaks-timeline-2016-9.

[83] Dahl, "A Homeland Security Net Assessment Needed Now!" 70.

2. Doctrine

Skypek defines doctrine analysis as evaluating a force's goals, threats, interest in engaging in conflict, and the manner in which an adversary will deploy these forces in a conflict.[84] These factors should be evaluated for blue and red force capabilities and will vary depending on the blue force and the adversary. For a DHS net assessment, these factors will undoubtedly depend on the type of adversary being analyzed.

For example, terrorist tactics have historically focused on overseas actions. From 2004–2013, only 36 Americans were killed in domestic terrorist actions.[85] The mass shootings in San Bernardino and Orlando may show a trend for radicalized individuals to carry out terrorist attacks within U.S. borders. The recent terror attacks using large trucks in Berlin and Nice, France also show a change in tactics from firearms and explosives. This potential for a rising trend in domestic terrorist attacks and through unconventional weapons should influence the doctrine analysis.

3. Strategic Asymmetries

Skypek defines strategic asymmetries as the relative advantage people have over their adversaries.[86] A DHS net assessor should look for these comparative advantages. These advantages can then be exploited and integrated into the overall strategy.

For example, red forces' lack of adherence to the legality of their actions gives rise to a comparative advantage. International organized criminal groups do not need to worry if their actions are legal. It is to their advantage to engage in illegal activity. DHS blue forces may have a comparative advantage in funding and manpower or advanced sensors, such as UAVs. Both red and blue forces exploit these advantages to gain the upper edge in capability.

---

[84] Skypek, "Evaluating," 8.

[85] National Consortium for the Study of Terrorism and Responses to Terrorism, *American Deaths in Terrorist Attacks* (University of Maryland, College Park, MD: National Consortium for the Study of Terrorism and Responses to Terrorism, 2015), 1, https://www.start.umd.edu/pubs/START_AmericanTerrorismDeaths_FactSheet_Oct2015.pdf.

[86] Skypek, "Evaluating," 8.

4. Scenarios

Scenarios are run against the net assessment to gauge their accuracy. Wargames are the most common tool for gauging this accuracy. Net assessors are required to evaluate the balance of capability from both their own perspective and from that of their adversaries.[87]

One option for the DHS net assessor is to utilize the existing program of national level preparedness exercises. DHS often engages in local and national level exercise events. Eagle Horizon is an example of a national level exercise. The purpose of Eagle Horizon is to test government agencies' ability to continue their mission after a major incident, such as a terror attack or natural disaster.[88] Using the methodology of these national level exercises, combined with the inclusion of a red force adversary into the exercise, provides a framework that can be used by the DHS net assessor to evaluate the accuracy of the net assessment.

C. TAILORING OF THE OUTPUT OF THE DOD NET ASSESSMENT MODEL FOR DHS

Figure 12 sectionalizes and focuses on the outputs of the DOD net assessment framework as tailored for DHS. This figure expands upon the final outputs or products resulting from the analysis.

[87] Skypek, "Evaluating," 8.

[88] Federal Emergency Management Agency, *Eagle Horizon Continuity Preparedness Exercise* (Washington, DC: Department of Homeland Security, 2015), 1, https://www.fema.gov/media-library-data/1427478016480-1f130d2e9411291637c9a08e22568fa4/2015EagleHorizonFactSheet.pdf.

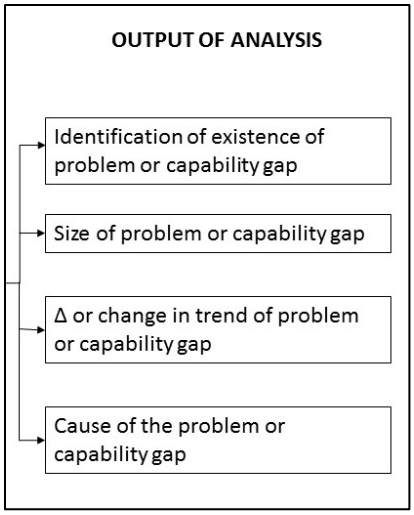


Figure 12. Net Assessment Model—Output of Analysis

Andrew Marshall proposed these results as the final output of the net assessment.[89] The answers to these questions are the purpose of the net assessment. Skypek notes the purpose of a net assessment is twofold. First, it reduces the barriers to strategic analysis typically found in large, bureaucratic organizations. Secondly, it informs policy leaders on how national strategy should proceed.[90]

The DHS net assessment model should utilize these same outputs. Forrest and Hilliker note that the advantage of a DHS net assessment is strategy driven by analytics rather than political or personal motives.[91] By changing these desired outputs, a bias away from analytics to politics or motive can possibly be conceivably inserted. No experts have suggested that it should be changed from the DOD to the DHS model.

In the next chapter, a notional net assessment in a DHS mission area is presented using this DHS net assessment framework.

[89] Marshall, "National Net Assessment," 2.

[90] Skypek, "Evaluating," 21.

[91] Forrest and Hilliker, "Why the Department of Homeland Security Needs an Office of Net Assessment," 16.

V. NOTIONAL DHS NET ASSESSMENT

> To discover how much or our resources must be mobilized for war, we must first examine our own political aim and that of the enemy. We must gauge the strength and situation of the opposing state. We must gauge the character and abilities of its government and people and do the same in regard to our own…To assess these things in all their ramifications and diversity is plainly a colossal task.[92]
>
> ~ Carl von Clausewitz

A. INTRODUCTION

In Chapter II, the aforementioned DOD net assessment framework was developed. In Chapter III, DHS strategic priorities and mission areas were identified. The information and analysis in these chapters formed the DHS net assessment framework in Chapter IV. In this chapter, a notional net assessment is developed to show how it can be applied.

As noted in the literature review, very few DOD net assessments are declassified and released to the public. Two examples, the 1983 U.S. and Soviet Strategic Forces Joint Net Assessment and the 1990 Joint Military Net Assessment, do provide some insight into a final product.[93] (It is important to note that these unclassified assessments are redacted.) Since this net assessment framework is designed to be flexible, these example products provide some insight into how DOD's final product is published. A DHS net assessment may be similar, but must be tailored to the senior level decision and policy makers.

As mentioned in Chapter I, this thesis is limited to net assessments of a two-party conflict between red and blue forces. Another aspect of the net assessment framework is its ability to be utilized in multi-party assessments between several parties, such as blue

---

[92] Carl von Clausewitz, *On War*, trans. Michael Howard and Peter Paret (New York: Oxford University Press, 2007), 230, http://www.myilibrary.com?ID=114695.

[93] Joint Chiefs of Staff, *1990 Joint Military Net Assessment* (Washington, DC: Joint Chiefs of Staff, 1990), http://www.dtic.mil/docs/citations/ADA344529; Secretary of Defense and Director of Central Intelligence, *U.S. and Soviet Strategic Forces Joint Net Assessment* (Washington, DC: Secretary of Defense and Director of Central Intelligence, 1983).

forces versus several red forces. It can also be used in assessments of conflicts between third parties (green forces) or complex, interrelated conflicts of blue, green, and red forces.[94] The utilization of multi-party and increasingly complex net assessments is discussed in the next chapter.

This example is focused on a conflict between a single blue and a single red force. If the development of the DOD net assessment model serves as a pretext to the development of a DHS net assessment model, it will take time to develop its value, usage, and tailoring to the DHS mission.[95] This net assessment (Figure 13) is shown to give an exemplar, not an archetype assessment for all DHS net assessments.

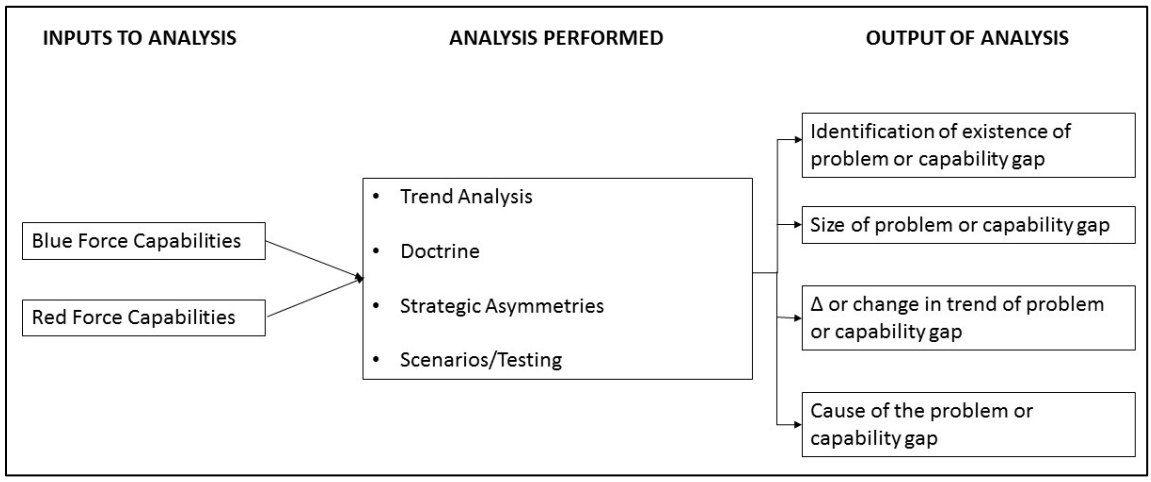


Figure 13. Net Assessment Model

B. MISSION AREA AND INPUTS TO ANALYSIS

1. DHS Mission Area

The DHS mission to be analyzed in this net assessment is to strengthen national preparedness and resilience. DHS defines this strategic mission as this nation's ability to

[94] Institute for Defense Analyses, *Net Assessment The Concept, Its Development and Its Future* (Alexandria, VA: Institute of Defense Analysis, 1990), 6, http://www.dod.mil/pubs/foi/Reading_Room/Other/Litigation%20Release%20-%20Net%20Assessment%20concept%20development%20future%20%20199005.pdf.

[95] Institute for Defense Analyses, 13.

safeguard against and respond to both manmade hazards, such as nuclear terrorism and cyber-attacks, as well as natural disasters.[96] This example net assessment focuses specifically on DHS' ability to prepare and respond to natural disasters within the United States.

2. DHS Blue Force Capability

In Chapter IV, the following four questions were developed to help in assessing blue force capabilities. Each is answered for this example.

- What is the definition of the scope of this mission area?

The National Preparedness Goal is to "be prepared for the threats and hazards that post the greatest risk, including…catastrophic natural disasters."[97] Its subgoals are to prepare, mitigate, respond, and recover from natural disasters.[98] The mission area is defined as the capability to prevent, protect, mitigate, respond, and recover from natural disasters.[99]

- What are the assets required to prevent, detect, investigate, mitigate, and respond and recover to incidents within this mission area?

Numerous assets are required to accomplish this mission as delineated as follows.

- Prevent: As defined within the National Prevention Framework, natural disasters do not fall within the scope of this capability.[100]

- Protect: The National Protection Framework provides specifics as to the scope of the protect mission area for DHS as it relates to natural disasters.

---

[96] Department of Homeland Security, The 2014 Quadrennial Homeland Security Review, 71.

[97] Department of Homeland Security, 72.

[98] Department of Homeland Security, 71.

[99] "National Planning Frameworks," Federal Emergency Management Agency, last updated October 30, 2019, https://www.fema.gov/national-planning-frameworks.

[100] Federal Emergency Management Agency, *National Prevention Framework*, 2nd ed. (Washington, DC: Department of Homeland Security, 2016), 3–4, https://www.fema.gov/media-library-data/1466017209279-83b72d5959787995794c0874095500b1/National_Prevention_Framework2nd.pdf.

The Framework defines protect as reducing the consequences to critical infrastructure (CI) as a result of a natural disaster.[101] The assets required for DHS to accomplish this task are personnel and funding to work with the private and government critical infrastructure owners to increase their protection.

- Mitigate: The National Mitigation Framework lists several responsibilities for long-term vulnerability reduction. Specific to the government, these responsibilities include determining building codes, limiting development in disaster hazard zones, creating standards, rebuilding buildings and infrastructure after a disaster to stricter code, and assisting in community planning.[102] The Framework also lists operational coordination as critical to this subgoal.[103] The assets required for this capability are personnel and funding for the identification of hazard areas, research into stronger building codes, and disaster communications capability.

- Respond: Defined by the National Response Framework as the ability to "save lives, protect property and the environment, stabilize communities, and meet basic human needs following an incident."[104] Specific to DHS, this subgoal requires DHS to be the principal federal official (PFO) during a natural disaster. DHS also acts as a support mechanism for the local, state, tribal governments, non-governmental organizations, and private sector efforts during recovery from a natural disaster.[105] FEMA plays a

---

[101] Federal Emergency Management Agency, *National Protection Framework*, 2nd ed. (Washington, DC: Department of Homeland Security, 2016), 3, https://www.fema.gov/media-library-data/1466017309052-85051ed62fe595d4ad026edf4d85541e/National_Protection_Framework2nd.pdf.

[102] Federal Emergency Management Agency, *National Mitigation Framework*, 2nd ed. (Washington, DC: Department of Homeland Security, 2016), 28, https://www.fema.gov/media-library-data/1466014166147-11a14dee807e1ebc67cd9b74c6c64bb3/National_Mitigation_Framework2nd.pdf.

[103] Federal Emergency Management Agency, 29.

[104] Federal Emergency Management Agency, *National Response Framework*, 3rd ed. (Washington, DC: Department of Homeland Security, 2016), 1, https://www.fema.gov/media-library-data/1466014682982-9bcf8245ba4c60c120aa915abe74e15d/National_Response_Framework3rd.pdf.

[105] Federal Emergency Management Agency, 16.

major role in disaster recovery by distributing funds, housing, food, and water to citizens.[106] The assets required for this capability are manpower and funding to provide this disaster response during and after a natural disaster.

- What DHS entities and subcomponents contribute significant capability in this mission area?

DHS notes that FEMA is the primary agency tasked with performance measures in this mission area. FEMA provides grants, funding, services, consultation, and materiel for disaster recovery. The USCG also provides some capability in this area for rescue efforts during a maritime disaster.[107]

- What other governmental (foreign/federal/state/local/tribal) organizations contribute toward U.S. capability in this mission area?

- What non-governmental organizations, such as private sector partners, academic institutions, and research partnerships, contribute to significant capability in this mission area?

Additional capability in the natural disaster mission is provided by numerous entities, as noted in both DHS' QHSR and its Strategic Plan. However, as the scope of this example net assessment is limited to DHS, these capabilities in the net assessment are not considered. A complex net assessment of the nationwide homeland security enterprise should entail these additional capabilities.

3. Red Force Capability

In Chapter IV, the following three questions were developed to assess a red force's (adversary's) capabilities.

- Who (or what) is actively working against DHS within the mission area?

---

[106] Federal Emergency Management Agency, *National Response Framework*, 17.

[107] Department of Homeland Security, *Fiscal Years 2014–2018 Strategic Plan*, 39.

- Is this actor a true adversary as defined by the DOD net assessment model? (it may preclude accidents as an adversary.)
- What are that adversary's capabilities to defeat DHS efforts in this mission area?

Natural disasters do not fall under the strict definition of an adversary as defined by the DOD net assessment model. Natural disasters occur; they are not the result of a malicious actor. However, as weather patterns can be observed as a trend and natural disasters require significant long-term planning, they can be considered an adversary in the DHS net assessment model.

One way to measure natural disaster "capability" is to define it by the damage caused. The National Oceanic and Atmospheric Administration (NOAA) states that since 1980, 203 natural disaster events caused in excess of $1 billion U.S. dollars in damages, or an average of 5.5 events per year. In 2016, 15 events were recorded, which was the second highest year. Damages in 2016 totaled 15 billion U.S. dollars and caused 138 deaths.[108] Utilizing the graph in Figure 14, the spike in natural disaster costs in recent years can be observed, as compared to the costs before 2011, which can be used later in trend analysis. The graph displays how the year end costs of the most recent years from 1980–2016 show a marked increase in damage costs as compared to the average trend over the entire span of the data. It also shows how disasters are beginning earlier in the calendar year in recent years as compared to the overall trend.

[108] "Billion-Dollar Weather and Climate Disasters: Overview," NOAA National Centers for Environmental Information, 2017, https://www.ncdc.noaa.gov/billions/.

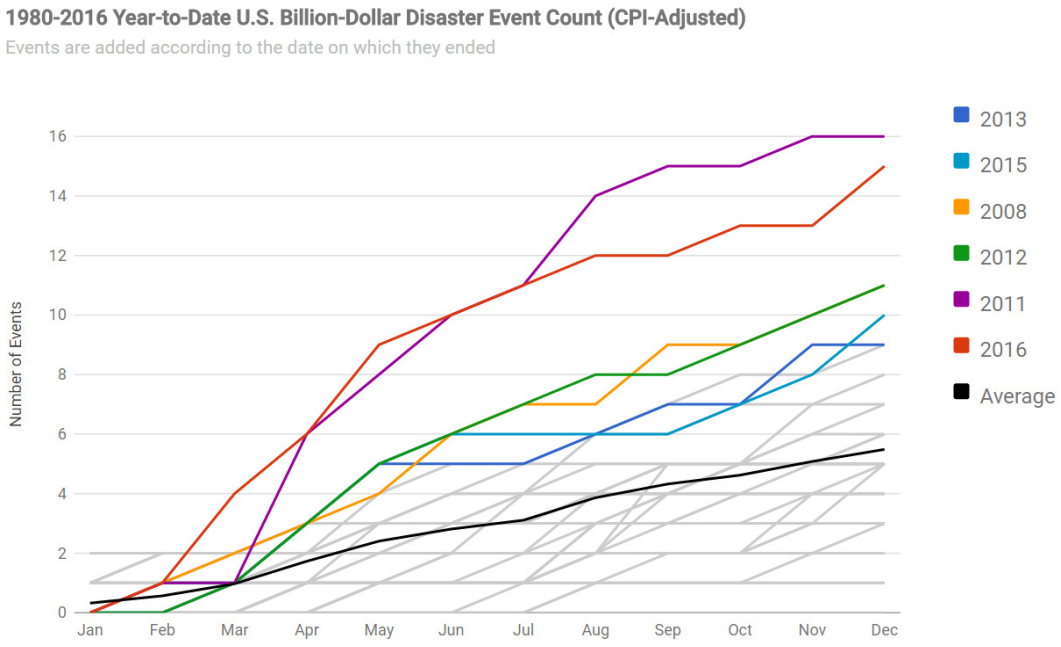


Figure 14. 1980–2016 Year to Date U.S. Billion U.S. Dollar (USD) Disasters.[109]

C. ANALYSIS PERFORMED

Figure 15 shows the analyses conducted upon the capabilities of both blue and red forces. The types of evaluations completed upon the data are displayed and are further explained in this section.

[109] Source: NOAA National Centers for Environmental Information.

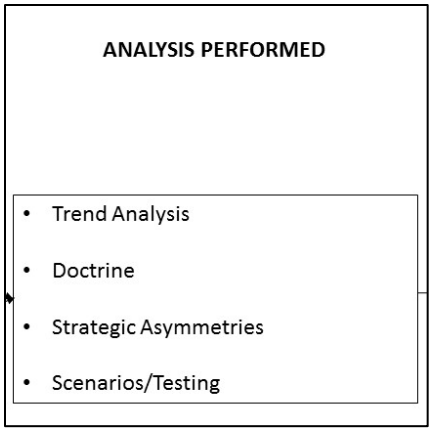


Figure 15. Net Assessment Model Analysis

In Chapter IV, these four analyses were provided as the pillars of net assessment. Each area is explored to determine how the blue and red force capabilities can be assessed.

1. Trend Analysis

In Chapter IV, trend analysis was shown to be useful when conducted in the areas of technology, budget, and legitimacy. With respect to natural disasters, it would be hard to make a comparison in abilities in technology between blue and red forces. Blue forces (DHS) would always have a competitive advantage because natural disasters are not becoming "smarter." For example, Hurricane Sandy targeted New York and New Jersey due to weather patterns, not as an exploitation of their lower levels of hurricane preparedness as compared to Florida. However, technology trends in building codes and disaster resilience/recovery should be considered to determine if advances in technology contribute toward a net positive capability in this mission area.

The trend of legitimacy will probably not apply to this net assessment. Some dispute may arise as to the federal government's ability to restrict development in or enforcement of building codes in natural disaster prone areas. However, it is generally accepted that the federal government does and should play a vital role in the mission to prevent, protect, mitigate, respond, and recover from natural disasters.

Budget trend is an important component of this analysis. FEMA's funding can be utilized as a metric to determine if increased funding results in a net capability advance

over natural disasters. In this case, funding over the last decade can be reviewed. In FY 2005, FEMA funding was $7.5 billion U.S. dollars.[110] In FY 2015, FEMA funding was $14.4 billion U.S. dollars.[111] This increase of FEMA's budget (once adjusted for inflation and consumer price index) can be extrapolated to FY 2025 assuming the long-term trend is forecast for consistent FEMA budget increases.

Weather trends are an important part of this analysis piece. In the 2014 QHSR and Strategic Plan, DHS noted the increased damage trend for natural disasters due to climate change, declining infrastructure, and more people in disaster prone areas. They also note how the changing climate may exert itself in other areas, such as how global warming that may tax the nation's electrical infrastructure. The number of events per year has also significantly increased, as shown in Figure 16.

[110] Department of Homeland Security, *Budget-in-Brief Fiscal Year 2006* (Washington, DC: Department of Homeland Security, 2005), 58, https://www.dhs.gov/sites/default/files/publications/Budget_BIB-FY2006.pdf.

[111] Department of Homeland Security, *Budget-in-Brief Fiscal Year 2016* (Washington, DC: Department of Homeland Security, 2015), 93, https://www.dhs.gov/sites/default/files/publications/FY_2016_DHS_Budget_in_Brief.pdf.

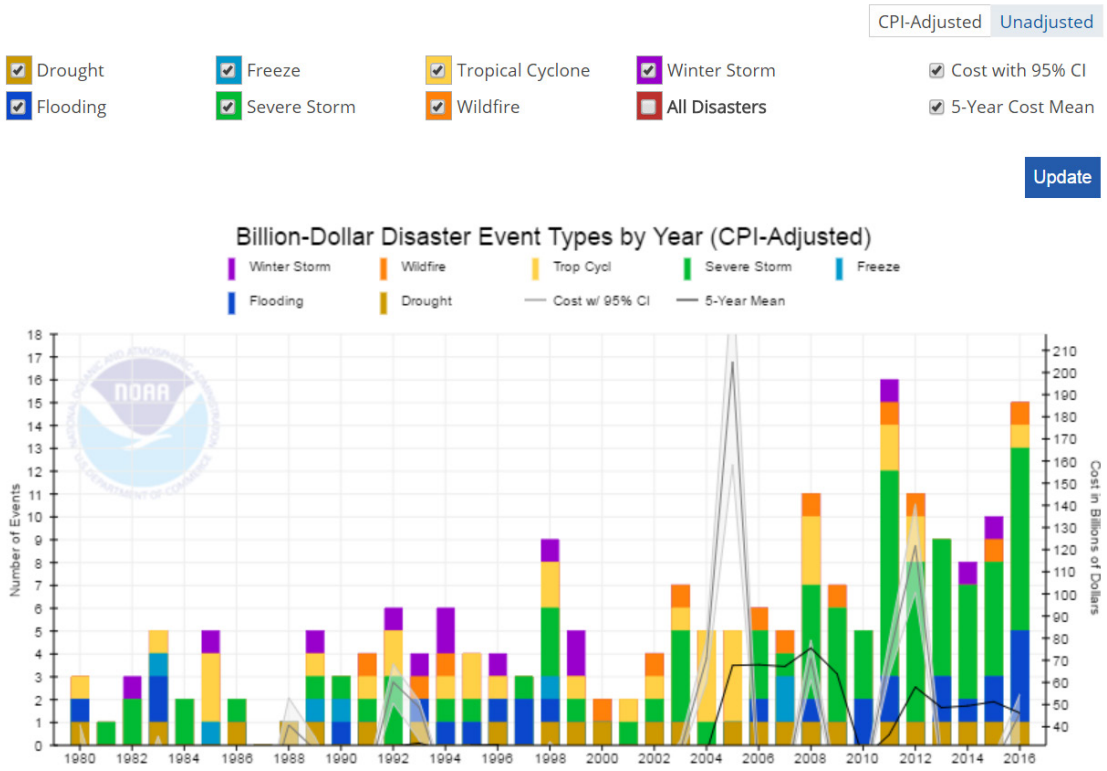


Figure 16. 1980–2016 U.S. Billion USD Disasters by Event Type.[112]

This trend can be extrapolated to show increased disaster events in the future.

2. Doctrine

As noted in Chapter IV, Skypek defines doctrine analysis as evaluating a force's goals, threats, interest in engaging in conflict, and deployment of these forces by an adversary in a conflict.[113] This analysis is not completely applicable to the red force. Natural disasters simply happen. They do not have a goal in their existence, nor do they deploy forces.

However, a doctrine analysis can be applied to the blue force capability. As noted previously in this chapter, the National Planning System provides DHS strategic level

[112] Source: "Billion-Dollar Weather and Climate Disasters: Time Series," NOAA National Centers for Environmental Information, 2017, https://www.ncdc.noaa.gov/billions/time-series.

[113] Skypek, "Evaluating," 8.

planning architecture to meet the National Preparedness Goal.[114] The DHS net assessor should review this document and its supporting planning frameworks to conduct a doctrine analysis.

3. Strategic Asymmetries

In Chapter IV, Skypek defines strategic asymmetries as the relative advantage people have over their adversaries.[115] In analyzing blue force capabilities, DHS holds a comparative advantage in technology over natural disasters with some exceptions. For example, hurricane models developed over the decades can forecast the predicted path of hurricanes over a few days.[116] Weather satellites, ground stations, balloons, and aircraft can accurately measure weather metrics.

However, it remains difficult to predict events like earthquakes and tornadoes. Conditions for tornadoes can only be predicted a few hours in advance at most.[117] The same holds true for flash floods.[118] Earthquakes cannot be predicted except over a span of several decades.[119]

This strategic asymmetry in certain types of natural disasters results in comparative advantages on both sides. The DHS net assessors can utilize these comparative advantages to exploit their capabilities. Where the adversary holds a strategic advantage, its root cause should be examined to determine a cause. For example, the technology for imminent earthquake warnings does not exist.

---

[114] "National Planning System," Federal Emergency Management Agency, last modified November 15, 2016, https://www.fema.gov/national-planning-system.

[115] Skypek, "Evaluating," 8.

[116] "NHC Track and Intensity Models," National Hurricane Center and Central Pacific Hurricane Center, updated June 11, 2019, http://www.nhc.noaa.gov/modelsummary.shtml.

[117] "Tornado Forecasting," National Severe Storms Laboratory, accessed January 28, 2017, http://www.nssl.noaa.gov/education/svrwx101/tornadoes/forecasting/.

[118] "Flood Forecasting," National Severe Storms Laboratory, accessed January 28, 2017, http://www.nssl.noaa.gov/education/svrwx101/floods/forecasting/.

[119] "Can You Predict Earthquakes?" United States Geological Service, last modified November 16, 2016, https://www2.usgs.gov/faq/categories/9830/3278.

4. Scenarios

DHS net assessors can utilize these trends in weather, population migration, climate change, budget, and assets as information for war gaming. As noted in Chapter IV, DHS net assessors can utilize existing national exercise frameworks. Net assessors can plug the trend information into the exercise framework as extrapolated a decade or more into the future.

As an example, DHS could conduct a wargaming exercise on a hurricane making landfall in South Florida. Rather than using current population information, the net assessor team can extrapolate the trends of budget, global warming, technology, population, weather, and assets 10 years into the future. The same exercise scenario can then be conducted as "Exercise Cuban Coffee 2027" rather than a current year exercise. Information resulting from this exercise can then be analyzed to see if the net assessor's model is accurate.

D. OUTPUT OF THE DHS NET ASSESSMENT MODEL

Figure 17 was introduced the previous chapter. It is reintroduced in this chapter to show the expected outputs of the DHS net assessment model.

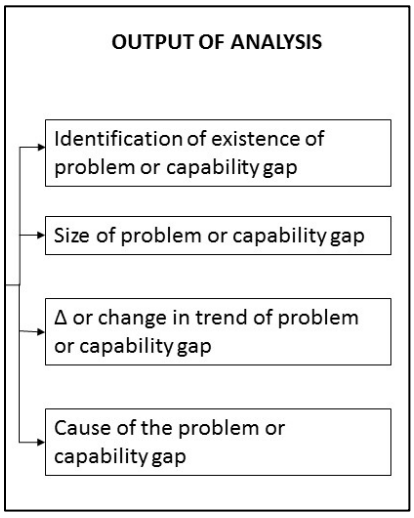


Figure 17. Net Assessment Model Output

In previous chapters, the following four outputs should be the final result of the DHS net assessment. For this example net assessment, the abilities and analysis are compiled to complete the output.

1. Identification of Existence of Problem or Capability Gap

In this analysis, one major problem with the capability to complete the natural disaster mission was identified. It is not possible to predict tornadoes, floods, or earthquakes. (Inadequate building codes can also be another primary problem, but this topic is outside the DHS only net assessment scope.)

2. Size of Problem

In 2006, FEMA estimated that damages caused by earthquakes totaled approximately $5.3 billion U.S. dollars per year.[120] Damages by severe storms (other than cyclones and hurricanes) and flooding totaled $30.5 billion U.S. dollars in 2016 and resulted in 78 deaths.[121]

3. Delta or Change in Problem

As shown in Figure 18, the trend of damage from severe storms and flooding has been increasing since 1980. The graph displays how the year end costs of the most recent years from 1980–2016 show a marked increase in damage costs as compared to the average trend over the entire span of the data. It also shows how disasters are beginning earlier in the calendar year in recent years as compared to the overall trend.

[120] "FEMA Prepares New Study of Annualized Earthquake Losses," Federal Emergency Management Agency, last modified January 3, 2017, https://www.fema.gov/fema-prepares-new-study-annualized-earthquake-losses.

[121] "Billion-Dollar Weather and Climate Disasters: Summary Stats," NOAA National Centers for Environmental Information, accessed January 25, 2017, https://www.ncdc.noaa.gov/billions/summary-stats.

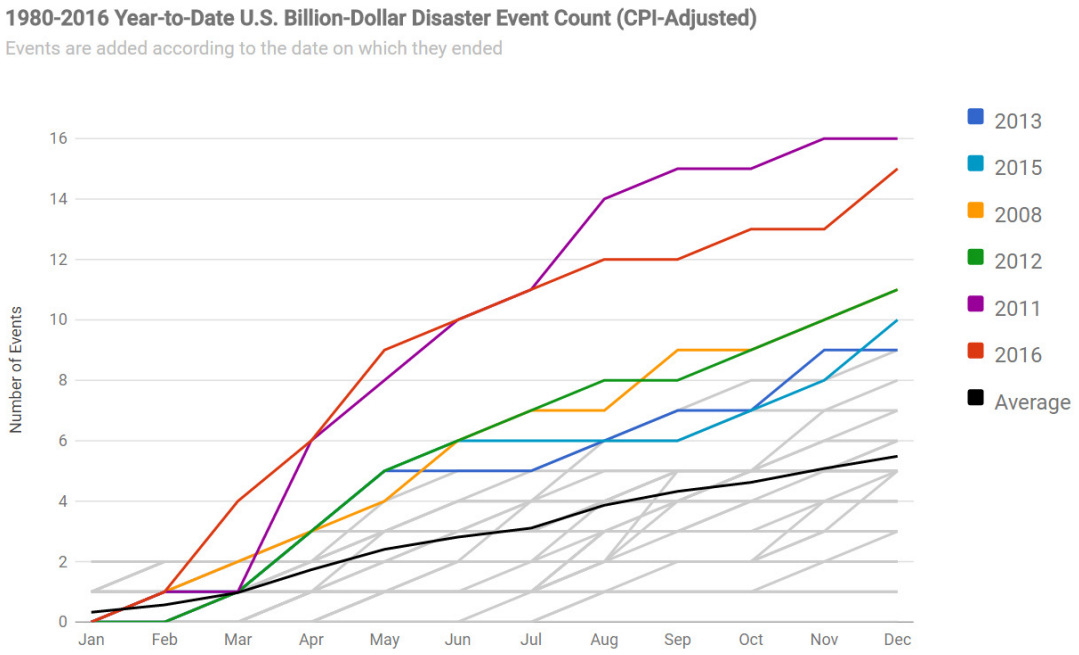


Figure 18. 1980–2016 Year to Date U.S. Billion U.S. Dollar (USD) Disasters.[122]

In 1980–1982, the total damages (adjusted for inflation and CPI) for these three years were $4.8 billion U.S. dollars.[123] In 2016, the damages were approximately seven times that amount. The delta of this problem is increasing. Not only is it a problem, but it is getting exacerbated. While the increase of population does account for some of the increased damage (226 million in 1980 versus 308 million in 2010), it does not account for all the increased damage.[124]

4. Cause of the Capability Gap

The root cause of this problem is twofold. First, inadequate building codes and decaying infrastructure account for some of this damage. This cause falls outside of the

[122] Source: NOAA National Centers for Environmental Information, "Billion-Dollar Weather and Climate Disasters: Overview."

[123] NOAA National Centers for Environmental Information, "Billion-Dollar Weather and Climate Disasters: Summary Stats."

[124] "Fast Facts," United States Census Bureau, accessed January 25, 2017, https://www.census.gov/history/www/through_the_decades/fast_facts/.

scope of this particular DHS net assessment, as implementation of strict building codes and infrastructure funding largely fall outside the mission or capability of DHS. The second root cause is the inability to forecast severe flooding, tornadoes, and earthquakes. While research into these events falls under non-DHS entities, such as the National Weather Service and the U.S. Geological Service, the lack of predictability, especially given climate change as mentioned earlier in this chapter, contributes to the capability gap.

This change is one simple example of how the net assessment model can be used for long-term planning for a DHS strategic mission. With additional data on adversarial and DHS' capabilities, this model can be modified and expanded to account for additional complexities with additional inputs and values. One example of building upon this model would be accounting for non-US countries' effect on global warming through failure to regulate pollution or carbon dioxide emissions. Additionally, the efforts and capabilities of allied forces (such as state, local, tribal governments) can also be added into these models to build upon a nationwide capability analysis in these strategic missions. These forecasts could be used by government leaders at the federal, state, and local levels to understand their capability gaps in any homeland security mission space and where best to spend limited budgets to minimize these gaps.

THIS PAGE INTENTIONALLY LEFT BLANK

VI. CONCLUSION

> Grand strategy should both calculate and develop the economic resources and man-power of nations in order to sustain…. Grand strategy, too, should regulate the distribution of power between the several services, and between the services and industry…. A good cause is a sword as well as armor.[125]
>
> ~ B. H. Liddell Hart

Many think tanks and scholars have suggested the need for DHS to conduct long-term strategic planning. DHS should begin planning now for threats that have not emerged rather than being reactionary after an event. For example, the National Institute of Standards and Technology is already planning for new encryption standards to protect against quantum computer decryption despite the quantum technology being a decade away.[126]

The DOD has conducted long-term strategic analysis between friendly and enemy forces by utilizing a net assessment model. The DOD net assessment model provides an adaptable framework for long-term strategic analysis. Net assessments can assist policy makers and senior leaders in addressing long-term capability gaps.

Future research can expand upon the net assessment framework. Research into multi-force analysis, such as multiple blue, red, and green forces, can expand the model. If DHS senior leadership decides to create a DHS ONA, they can undoubtedly have access to and benefit from a partnership with the DOD. This affiliation should reduce the trial and error experienced by Andrew Marshall's team for many years as they developed their process.

Further research may identify additional inputs especially in the areas of trend analysis and gaps in information on the capabilities of friendly, neutral, and adversary

---

[125] B. H. Liddell Hart, *Strategy*, 2nd ed. (New York: Praeger, Inc., 1967), 336.

[126] "NIST Kicks Off Effort to Defend Encrypted Data from Quantum Computer Threat," National Institute of Standards and Technology, updated January 8, 2018, https://www.nist.gov/news-events/news/2016/04/nist-kicks-effort-defend-encrypted-data-quantum-computer-threat.

forces. Research may also be conducted on the ONA organizational model and how to account for non-DHS blue forces, such as Department of Justice agencies and local, state, and tribal agencies.

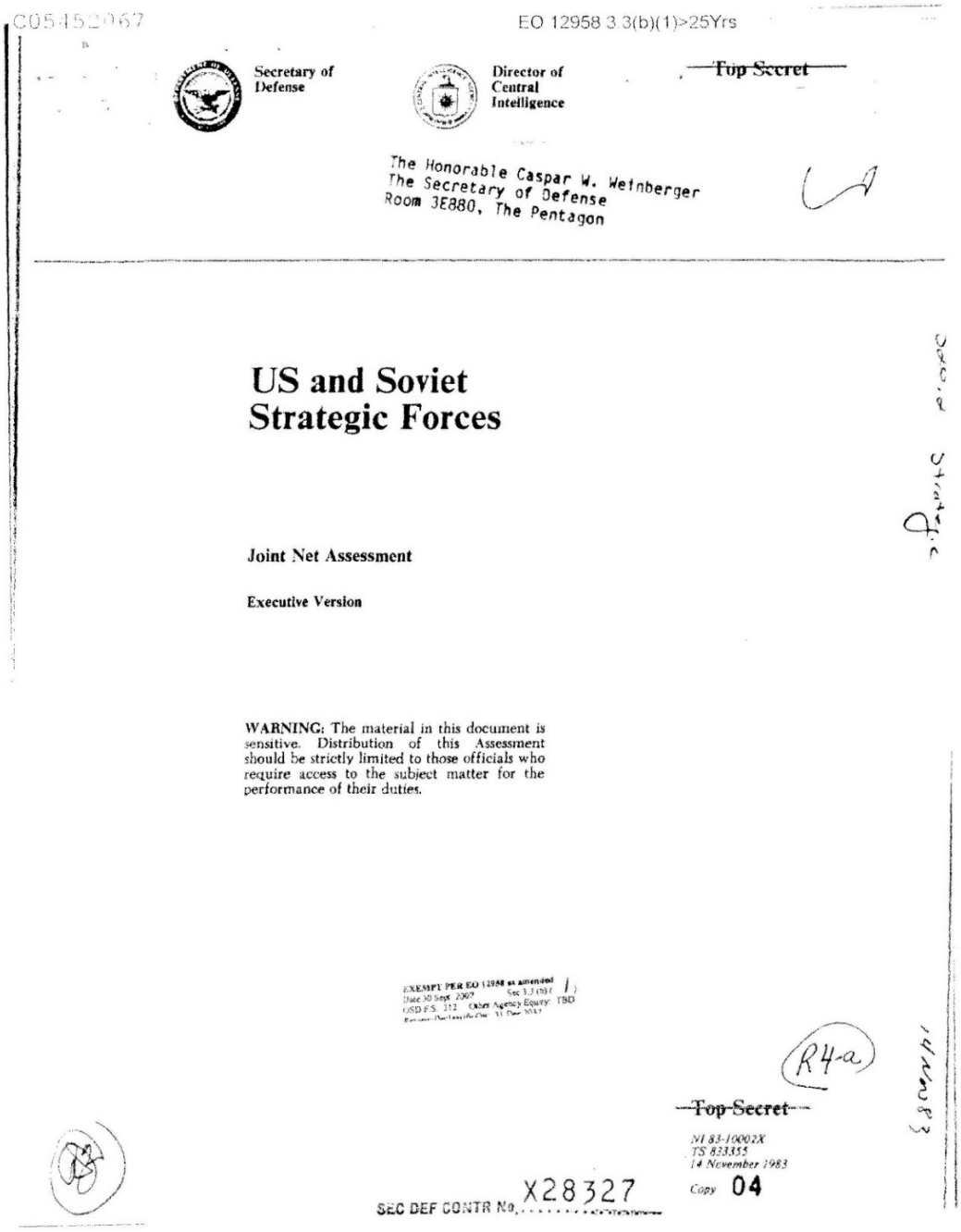
The 9/11 Commission noted that Congress had abdicated its strategic oversight of the executive branch in favor of "a focus on personal investigations, possible scandals, and issues designed to generate media attention."[127] A search of the Government Accountability Office's report database revealed only one 2005 report on DHS' long-term national security strategy.[128] As noted in the literature review, DHS needs to plan strategically beyond a political appointment or Presidential term of office. The model presented in this thesis is a suggested starting point in the development of a DHS net assessment that can be used for long-term strategic planning.

[127] Thomas H. Kean and Lee Hamilton, *The 9/11 Commission Report: Final Report of the National Commission on Terrorist Attacks upon the United States* (Washington, DC: National Commission on Terrorist Attacks upon the United States, 2004), 105.

[128] "Search," Government Accountability Office, accessed February 8, 2017, http://www.gao.gov/search?rows=50&now_sort=issue_date_dt+desc%2Ctitle_sort+asc&page_name=main&search_type=Solr&o=0&path=Reports+%26+Testimonies%3AReport&facets=a%3A2%3A%7Bs%3A14%3A%22tx_agency_term%22%3Bs%3A9%3A%22Executive%22%3Bs%3A24%3A%22tx_agency_executive_term%22%3Bs%3A31%3A%22Department+of+Homeland+Security%22%3B%7D&adv_begin_date=&adv_end_date=&adv=0&advanced=1&q=title%3Astrategy.

APPENDIX

An example of a declassified DOD net assessment.



C05452067

EO 12958 3.3(b)(1)>25Yrs

Secretary of Defense

Director of Central Intelligence

~~Top Secret~~

The Honorable Caspar W. Weinberger
The Secretary of Defense
Room 3E880, The Pentagon

US and Soviet Strategic Forces

Joint Net Assessment

Executive Version

WARNING: The material in this document is sensitive. Distribution of this Assessment should be strictly limited to those officials who require access to the subject matter for the performance of their duties.

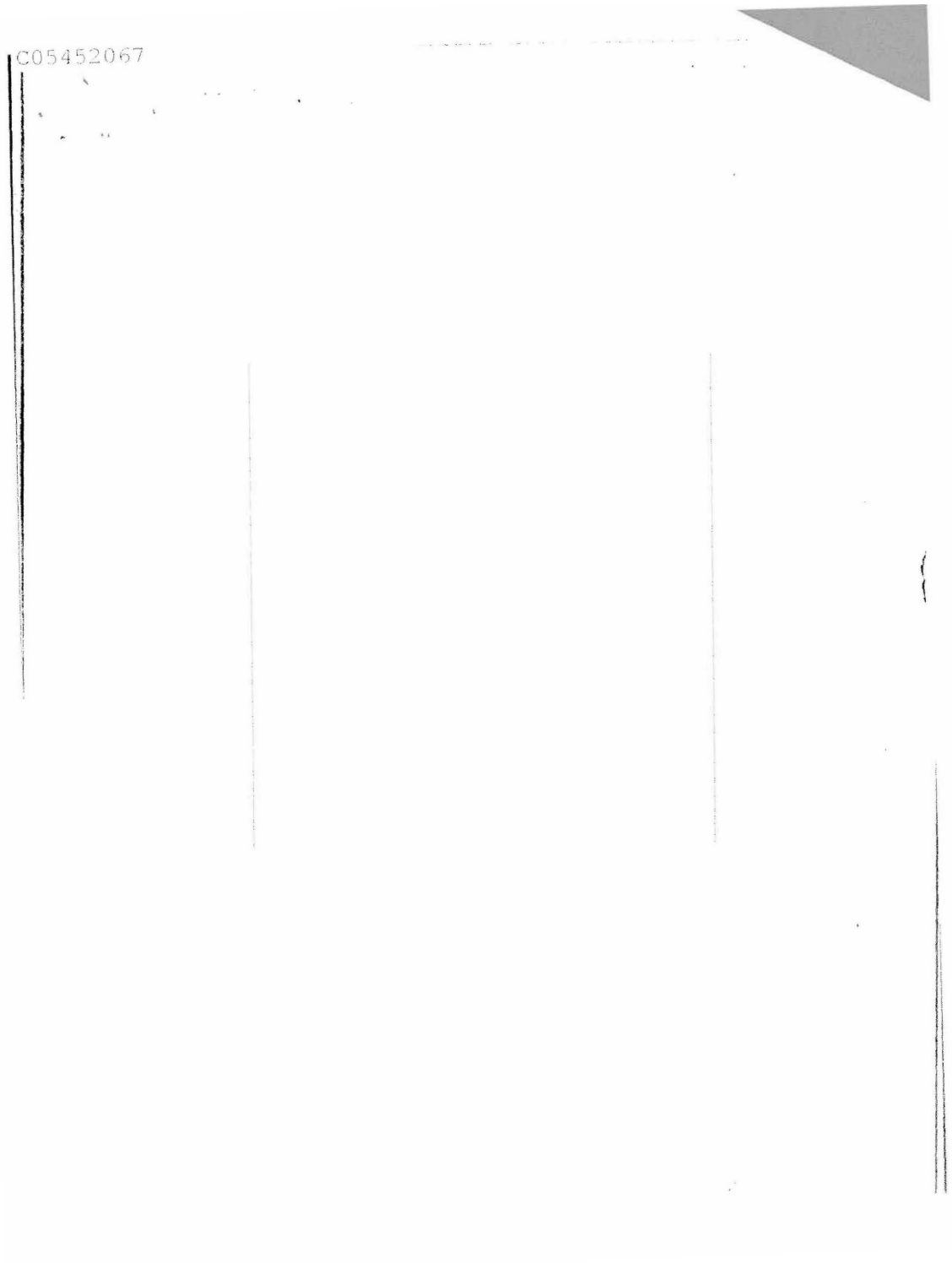
EXEMPT PER EO 12958 as amended
Date 30 Sept 2007 Sec 3.3 (b)(1)
OSD F.S. 312 Other Agency Equity: TBD

R4-a

~~Top Secret~~

NI 83-10002X
TS 833355
14 November 1983
Copy 04

SEC DEF CONTR No. X28327


C05452067

JOINT NET ASSESSMENT

US AND SOVIET STRATEGIC FORCES

EXECUTIVE VERSION

WARNING: The material in this document is sensitive. Distribution of this Assessment should be strictly limited to those officials who require access to the subject matter for the performance of their duties.

PREFACE

This first joint net assessment by the Secretary of Defense and the Director of Central Intelligence analyzes factors central to understanding the significance of the Soviet and US strategic postures. Emphasis is on displaying trends and key asymmetries in US and Soviet forces, perspectives, operational concepts, and capabilities. This assessment, although incomplete, is intended to serve as a prototype for future efforts and to identify areas for additional study and intelligence collection.

To a large extent, any net assessment is the result of review and synthesis of many diverse analyses of a broad subject area. In this assessment we discuss the serious deficiencies in our traditional analyses of the strategic balance. These analyses limit our perspective and cause distortions in our views of the strategic balance. If current work on improved methods is successful, future assessments will include more informed judgments. However, that research is not likely to bear fruit for at least several more years, and no amount of modeling and gaming can ever fully substitute for what we hope will continue to be a lack of operational experience in nuclear warfare.

A more detailed assessment is given in a separate supporting volume.

CONTENTS

KEY JUDGMENTS

The strategic nuclear balance is probably adequate to deter a direct nuclear attack on the United States or a major attack on Europe. The Soviets, in our view, have some clear advantages today, and these advantages are projected to continue, although differences may narrow somewhat in the next 10 years. It is likely, however, that the Soviets do not see their advantage as being as great as we would assess. Moreover, even in our assessments the Soviet advantages, while significant, do not appear to be great enough for us to be concerned that we no longer have the capability to deter large-scale nuclear war. Clearly we still do. The uncertainties in all this still would make it unattractive for the Soviets to escalate to such a level of warfare; they could not expect with high confidence to prevail. We are greatly concerned, however, about the effects of strategic nuclear imbalances on the behavior of the two sides in crises and lesser conflict situations.

The United States structured its major alliances during the period of US superiority in strategic nuclear forces. When our decisions were made in the early and mid-1960s to settle for parity, the concept of parity was seen by some as a good thing of itself. The full consequences of strategic parity for the overall military balance with the Soviets, for our position throughout the world, and for the cohesion of US alliances over the longer run have not yet been fully realized.

One consequence is that the range of Soviet actions we can deter has undoubtedly narrowed. The shift in the strategic balance over the last 15 to 20 years has made the Soviets more willing to try to coerce the Europeans and to try to split them from the United States. This policy is paying off; there has been an edging of many Europeans toward a position of neutrality, coincident with the buildup of Soviet strategic forces and of other Soviet forces focused directly against Europe. The Soviets have also been willing to exploit soft spots in the Third World more aggressively.

There is a heightened possibility that the Soviets might challenge some US interventions in crises, particularly those involving actions against a friendly or client state in the Third World. A major crisis, analogous to the Cuban missile crisis, in which we are forced to back down much as the Soviets did in 1962, would produce a massive shift in the perceptions of US strength relative to that of the Soviet Union in the eyes of the US public and of other nations.

If deterrence fails to one degree or another, the adequacy of the strategic balance would vary during the possible phases that might precede, constitute, and follow initial large-scale nuclear strikes:

— During a crisis, and in conflict prior to large-scale nuclear strikes, the US relative strategic position would probably improve over the peacetime situation with the generation of the full US bomber and ballistic missile submarine forces, and the deployment of our attack submarines, which are capable of attriting a large part of the Soviet SSBN force.

Although we believe the Soviets are closer to achieving their goals than we are to achieving ours, the Soviets would evaluate their own prospects more pessimistically, and would lack confidence in being able to succeed. They are highly concerned about:

— The capabilities of US antisubmarine warfare (ASW) against their submarines.

— The effects of new US programs on overall US capabilities.

— Their ability to degrade US command, control, and communications sufficiently to prevent a large-scale, well-coordinated retaliation.

— Their own ability to maintain continuity of command and control throughout key phases of a conflict.

How Much Do US Programs Help?

Renewed US efforts over the past several years will slow the erosion in the relative US position. However, it will take a long time, and a persistent effort, to redress our deficiencies. Although US investment will be substantial over the next decade, Soviet investment will also be considerable, will be more comprehensive, and will build on 20 years of previous investment. Our changes in policy and planning are as important as the increased investments.

The Soviets already show signs of being worried about our turnaround, which signals greater American seriousness about competing in the strategic force arena than has been evident for many years. The Soviets must fear that we will follow with the introduction of new technologies that would render the entire Soviet strategic posture much less effective. The President's speech of 23 March 1983 proposing US defenses against ballistic missiles has probably increased Soviet concerns.

From the Soviet perspective, the best way to avert these dangers is to try to prevent the United States from carrying through with our programs, using domestic opposition in the United States and Western Europe, diplomacy, and the arms control process. Eroding the credibility of US nuclear strength by any and all means, including arms control agreements and the negotiating process, is a central Soviet strategic aim; they made great progress in the 1970s. The Soviets have pursued a dual-track approach to arms control: seeking agreements which halt or slow US strategic force deployments, while continuing an across-the-board buildup and modernization of forces not limited by agreements.

Strategies for Competing More Effectively With the Soviets

The military programs the United States is now pursuing have a more competitive character than any since the mid-1960s. A more effective competitive strategy might include the following elements:

Complicating Soviet Military Problems: Evolving strategic offensive and defensive postures, which are so diversified as to pose

difficult problems of attack to the Soviets—postures strengthened by more emphasis on survival, wartime endurance, and robust C³I.

Leveraging Our Lead in Technology: Selectively exploiting our lead in technology to introduce qualitatively superior new US weapons systems, which could render obsolete large portions of the capital stock of weapons in the Soviet arsenal and cause them to react in ways costly to them but not to us (for example, air defense). We could also strengthen deterrence by playing on Soviet fears about our technical prowess. It may be better to allow the technological competition in defensive systems to proceed, rather than try to stop it, in the dubious belief (not shared by the Soviets and rejected by the President in his strategic defense initiative) that active defenses are bad per se.

Altering the Thrust of US Arms Control Initiatives: Much more limited agreements, more readily verified, may be more feasible than the comprehensive kind that we have been seeking (for example, more like the atmospheric nuclear test ban rather than SALT or START). In this case, arms control could partially constrain the Soviet Union, but there would be no illusion that an agreement is a panacea for the strategic competition—the illusion that attended SALT I and SALT II. To be successful we would have to change the public perception of arms control as the solution to our strategic force problems, to one of arms control as an adjunct to our strategy for competing with the Soviets

Reasssessing the Role of Allies: The largest unsolved problem created by the growth of Soviet nuclear power is a new strategy for the defense of Europe. We have sought a cheap defense based on the threat of nuclear escalation, but the growth in Soviet strength has eroded the basis for such a strategy. There are several alternatives for improving the defense of Europe, including a change in the willingness of the Europeans to invest in their own security, a greater role for the British and French nuclear forces in the defense of Europe, and a conscious exploitation of instabilities in Eastern Europe.

I. INTRODUCTION

Problems With Traditional US Analyses

1. Among the many weaknesses of traditional major US strategic nuclear force analyses, three illustrate the limitations: the limited scope of scenarios; the simplifying assumptions used in mathematical calculations; and, until recently, the limited consideration of specific Soviet approaches to assessment of the military balance.

2. ***Limited Scenarios.*** Much effort has been expended in constructing models of intercontinental nuclear force interactions. However, the spectrum of scenarios has been narrow, with concentration primarily on what was perceived to be the most stressful, if least likely, cases (for example, "bolt-from-the-blue" surprise attacks on the homelands). A scenario that is more likely, and that poses a different set of difficult problems, would be a crisis or theater war that led to, or threatened to lead to, strategic nuclear conflict, in which strategic forces could be partially "out of position" and in which some had been diverted from the strategic nuclear mission or attrited during the theater war.

3. The use of strategic nuclear forces in theater warfare, or as a lever for escalation control, has been treated infrequently. Similarly, there has been little examination and planning for reconstitution of remaining forces following major nuclear strikes. Thus, for example, there has been much attention given to Emergency Action Messages for execution of the Single Integrated Operations Plan (SIOP) in the event of surprise attack, but little to command and control of military operations after SIOP execution. After the signing of the Antiballistic Missile (ABM) Treaty, we were no longer concerned about our strategic defenses and we did not make preparations for being able to recover from a major nuclear strike.

4. ***Simplifications.*** Important operational factors attendant to nuclear conflict were either ignored or handled with assumptions to fit the state of the art in computer simulation and mathematical representation of a single, all-out nuclear engagement. The norm has been to model stylized exchanges that measure destruction (for example, expected blast damage) for offensive weapons against fixed targets. Even the highly detailed and complex simulations used to measure the strategic balance, while in many cases technically excellent, incorporate almost no considerations of the sequence of actions over time, and few operational factors. For example:

- Only recently are the effects of the loss of command, control, communications and intelligence (C^3I) being considered—although warning, attack assessment, and communications connectivity are essential elements of a nuclear war. (For example, we have tended to assume adequate US communications in our depictions of the results of nuclear attacks, although the Soviets are known to emphasize attacks on C^3 in order to degrade or prevent US force execution.)
- Operations-related factors such as mobility and deception have not received enough attention—although this too is being corrected. (For example, we tended to ignore the mobility of Soviet general purpose forces. We implicitly equated destroying the fixed installations with destroying the forces, although acknowledging that this would not be the case once they deployed to the field.)
- Analyses have generally failed to consider the ability to reconstitute forces after a nuclear strike. The impacts of casualties and damage on mission accomplishment over time have not been well considered.

5. ***Mirror Imaging the Opposition.*** Even though the focus has been on deterrence, there has been limited attention given in our analyses to the factors that the Soviets would regard as most important. An implicit assumption has been that Soviet assessments are similar to our own. Soviet methods of structuring and analyzing the problem have not generally been used.

- Soviet measures of effectiveness and criteria for success are different, stressing specific military operational objectives and the ability to control events so as to achieve objectives within a predetermined time schedule.

— Soviet concepts of war, the scenarios they envision, and the roles and missions of their forces have not been captured in our analyses, even though we do know some things about them. We have tended to focus on strategic forces in isolation and ignored combined-arms effects, assumed symmetric force employment, not considered strategic consequences of theater nuclear forces, failed to fully consider the asymmetry of defensive forces, and ignored the prospects for Soviet reconstitution.

Structure of This Assessment

6. Because we lacked the ability to analyze the outcomes of crises and nuclear military campaigns in a comprehensive manner, past assessments focused on trends and asymmetries in key static indexes of force postures. In this assessment we address implications of these trends and asymmetries for possible conflict outcomes—whether they are likely to be favorable, adverse, or constant. This approach provides richer insights into the balance than can be obtained from static force comparisons.

7. This net assessment directly addresses (albeit incompletely) for the first time questions that are central to the effectiveness of US deterrence—Soviet assessments of the strategic balance, and relative capabilities of the two sides to deal with the eventualities of failed deterrence. It compares the potential operational effectiveness of the US and Soviet postures, examines the capabilities the Soviets regard as significant, and explores a range of conflict situations.

II. MAJOR FINDINGS

10. This net assessment differs from traditional US analyses of the strategic force balance by considering specifically the Soviet assessment, by comparing the potential operational capabilities of US and Soviet weapons and force postures, and by examining the influence on the balance of a range of conflict situations. The extensive analysis of comparative trends and asymmetries developed for each of these subjects is briefly summarized in the annex and is detailed in a separate supporting volume. In this chapter, we report the principal findings, which provide the basis for the observations presented in chapter III.

The Soviet Assessment of the Balance

11. Whether the US strategic posture is successful in deterring a wide variety of Soviet actions depends on Soviet assessments of the balance

12. Most important are the basic differences between Soviet and US strategic thought. Soviet thinking has been more consistently Clausewitzian. It is clear that Soviet leaders strongly want to avoid a large-scale nuclear war because of concern for its destructiveness and because of their special concerns about the potential in such a situation for losing control over their people and client states. But the Soviet view recognizes that such a war might nevertheless happen, perhaps despite the interests of the belligerents themselves. Wars, it is felt, usually do not proceed according to peacetime plans, and there is always the danger of uncontrollable escalation from a crisis or theater conflict.

13. On the one hand, this concern has made Soviet leaders especially wary of direct involvement in regional conflicts, especially if in opposition to the United States. (This wariness may be less evident in the future. See chapter III, page 21.) At the same time, it has led them to invest heavily in capabilities intended to provide the USSR with a comparative advantage were the contingency actually to occur. This approach emphatically extends to massive nuclear war especially important vis-a-vis Europe, in light of the historical dependence of NATO on the US nuclear guarantee and the threat of nuclear escalation.

14. These measures are reinforced by the Soviet outlook on nuclear deterrence, which apparently holds that the possessor of a strong, preferably dominant, nuclear posture can thereby exert an influence on others without having to use it. Adversaries might be deterred from acting in response to Soviet regional moves for fear that, if escalation to nuclear war occurred, the outcome would be very disadvantageous for them and not equally bad for the Soviet Union. Having such a strong nuclear posture is seen to be

Conversely, the United States, at least since the mid-1960s, has viewed the likelihood of nuclear war as sufficiently low, and the consequences so unthinkable, that a similar degree of comprehensive planning was deemed unnecessary and much less emphasis was placed on being able to prosecute such a war if it actually did occur.

Adverse Trends for the United States in Most Areas

17. These fundamental differences between US and Soviet strategic thought are reflected in the asymmetric force postures of the two sides. Because the Soviets regard nuclear war as a continuing possibility, and have rejected mutual vulnerability as a desirable or permanent basis for the US-Soviet strategic relationship, they seek superior capabilities to fight and win a nuclear war with the United States and have been working to improve their chances of prevailing in such a conflict. Until recently, in US major force structure and budget considerations the United States has measured adequacy in terms of the capability of US strategic forces to survive an initial Soviet strike with enough weapons to be capable of inflicting extensive damage on Soviet society in retaliation.[1] A major factor influencing US strategic programs was the limitation on overall defense spending in the 1970s. Overall, the United States has concentrated its effort on a comprehensive development of offensive forces and, to a lesser extent, C³.

[1] It is important that we draw a distinction between US declaratory policy—the policy criteria for procurement in the public debate—and the US targeting policy that is reflected in SIOP plans. In the past, actual targeting plans provided for considerably more emphasis on counterforce and countermilitary strikes than the public debate would indicate was the case. During much of the 1960s and 1970s the criteria used for force planning and programming, as well as the US declaratory policy, emphasized retaliation against urban-industrial targets, but US targeting policy, as reflected in SIOP plans, allocated most weapons to military targets. Present declaratory and targeting policies now more closely correspond and are intended to maximize deterrence by focusing attacks against those targets and functions that the Soviets see as most essential for carrying out their war plans.

18. As a result, trends in the static measures of the balance of forces have been generally adverse to the United States for the past decade, including forces on which the United States focused its attention—strategic offense. The Soviet Union gained rough parity in offensive forces, by most static measures except total deployed warheads, in the mid-1970s. Since then, both sides have steadily increased the number of deployed warheads; we still have a small lead in this measure, but overall Soviet capabilities have improved relatively more than our own.

19. The adverse trends in offensive forces have been aggravated by unfavorable trends in active defenses; this disparity has been reinforced by the developing differences in the targets that each side would attack to implement its nuclear strategy.

On the other hand, improved Soviet offensive capabilities face a set of fixed US targets that remain vulnerable.

20. The Soviet Union has been improving its active defenses, increasing the number of facilities that the United States would target, and improving the hardness of several target classes. There are a large number of movable elements associated with Soviet strategic forces and forces for conventional power projection that would not be in fixed facilities at the time of any US intercontinental nuclear attack. We have developed neither technical capabilities nor operational concepts for attacking such targets. We slowed the development of improved penetration aids for overcoming ballistic missile defenses, and allowed weapons kill potential to grow only modestly

21. For 10 years it has been US policy not to field viable air and missile defenses, while the Soviet Union steadily improved its air and missile defenses. The investment differential over the past decade has been on the order of 10 to 1 in favor of the Soviets. Building extensive US strategic air defenses to counter what was largely an obsolescent Soviet bomber force did not

seem worthwhile as long as we refrained from having ABM defenses and the Soviet Union relied primarily on ballistic missiles. We built and then abandoned an ABM system to defend ICBMs. The Soviets are now conducting a major modernization of their ABM system around Moscow, still limited in capability, but putting them in a better position to expand to a nationwide ballistic missile defense. They are also conducting a major modernization of their air defenses, including the introduction of an airborne warning and control system (AWACS) aircraft and new interceptor aircraft and SA-10s, systems with greatly improved technical capabilities against low-altitude penetrators.

22. We have taken some steps to improve the survivability of our offensive forces, including the hardening of ICBM silos when Minuteman III was deployed, and increasing the operating area for nuclear-powered ballistic missile submarines (SSBNs) as long-range C-4 submarine-launched ballistic missiles (SLBMs) were deployed. We are once again trying to establish a viable civil defense by preparing evacuation plans for millions of civilians in high-threat areas, but our passive defenses for military and industrial facilities are insignificant and earlier US population shelter programs have been allowed to decay.

23. US strategic C^3 systems were designed primarily to provide tactical warning and to execute the SIOP, essentially a massive retaliation in response to a massive attack. The overall C^3 system is not capable of surviving a Soviet nuclear attack to the extent that it would be adequate to support the National Command Authority in an extended nuclear war, and its survivability and connectivity for executing the initial retaliatory strike is problematic. Likewise, protection of the NCA itself is not adequate to provide high assurance of the survival of this function. Steps are being taken to improve C^3 and to increase NCA survivability.

25. New US active air and ballistic missile defense initiatives still do not match the Soviet level of effort. We have some technology on the shelf, such as advanced concepts for ABMs, and systems operational in small numbers—AWACS and F-15s—that have technology superior to the best Soviet technology. But the United States, as the result of a conscious policy, is deficient in numbers of deployed systems and lags the USSR in the breadth and pace of active defense R&D programs. The new Soviet bombers and a variety of cruise missiles will present a growing challenge to the thin US air defense network, even as it is modernized with new radars and interceptors.

26. Future trends depend on current US efforts to rebuild, the pace of Soviet investment in all four categories of strategic forces, and the arms control frameworks that may be negotiated. Unless arms control agreements radically alter the existing force structures, the relative trends in static force measures overall will remain adverse throughout the 1980s, and into at least the early 1990s, even if the current US strategic offensive modernization program is fully implemented. There will, however, be movement in specific measures in a direction favorable to the United States.

Some Positive Trends Now and for the Future

27. The trends in static measures we have discussed up to this point do not adequately capture some positive developments in the US posture that might be achieved by the end of this decade.

28. Beginning in the mid-to-late 1970s, a long process began that is having some positive effects. This is partly the result of new US programs and more resources, especially in recent years. But most of all it comes from a new appreciation by US leaders of the Soviet strategic threat and from an evolutionary change in US strategy. These changes led to an alteration in targeting policy with more emphasis on counterforce broadly conceived, more emphasis on attack on Soviet command and control (including both military and civilian leadership), and an increased emphasis on enduring capabilities for US forces and command and control beyond the initial strikes.

29. These efforts reflect, with a considerable lag, a US strategy based on a more accurate appreciation of Soviet military thinking and concerns. In effect, there is some convergence of Soviet and US views as to what is important and which dimensions of strategic power need attention. However, the long period of great asymmetry in the objectives of the two sides and other restraints on US strategic force improvements have left a legacy of an inferior US nuclear posture, inadequate to carry out our present strategy, and it will take a long time to redress US deficiencies.

30. We believe that the following positive developments are of special significance to any consideration of the strategic balance over the next decade:

— We are spending large sums for C³I and NCA survivability, which should soon enhance US command and control survivability for an initial retaliatory salvo and begin to provide endurance past an initial large-scale nuclear strike. These substantial improvements will increase Soviet uncertainties about their capability to disrupt US retaliatory strikes; this should make preemptive strikes less attractive, thus strengthening crisis stability. These improvements, however, will probably still not match previous and ongoing Soviet investments in forces and infrastructure for maintaining continuity of force command and control in nuclear conflict extending beyond initial large-scale intercontinental strikes.

— The numbers of US ballistic missile hard-target-kill-capable warheads will increase in the next decade. Also, the US threat to Soviet silos will grow with the introduction of several thousand air-launched cruise missiles (ALCMs) on US bombers. This is a worry to the Soviets, who depend so heavily on their silo-based ICBM force for carrying out strategic missions. They are spending considerable effort to field mobile ICBMs. (s)

— The President's advocacy of the desirability of defense, survival, and damage limiting in a nuclear war could lead to radical change in the US strategic posture before the end of the century, and perhaps shift the strategic balance significantly. The President's initiative on defense against Soviet ICBMs is not likely to affect deployments in the 1980s, although some concepts being proposed might be made operational by the early 1990s, if given high priority. But the Soviets are conscious of the impressive US technical achievements of the past, and they must be very concerned for the balance in the 1990s, if we mobilize our formidable technological skills to develop systems such as directed-energy weapons. Recent Soviet overtures to halt antisatellite (ASAT) systems development and testing are indicative of these concerns.

— Despite two decades of massive Soviet investment in homeland air defenses, US bomber forces are judged still able to penetrate Soviet defenses using low-altitude tactics, defense suppression, and defense avoidance; likewise a coordinated US ballistic missile attack could still readily saturate the treaty-limited Moscow ABM system. In this sense, the huge Soviet effort to deploy far-less-than-perfect defenses can be judged a net gain so far for the United States. To the extent that Soviet investment of the 1970s can be converted in the 1980s into a qualitative upgrade of its numerically large air defenses, our older B-52 bombers will suffer in their ability to penetrate. However, the B1-B, ALCM, advanced technology (Stealth) bomber and Stealth ALCM have the potential to render obsolescent billions of rubles of Soviet investment, and to force further Soviet expenditures on defenses rather than on systems that might be more threatening to the United States.

— The Soviets remain particularly sensitive to the US threat to their SSBN force, as evidenced by the large investment they have made to try to defend their submarines in bastions close to the

Soviet homeland. The Soviets could lose many of their SSBNs during the conventional phase of a conflict, if the United States chose to mount a strategic antisubmarine warfare (ASW) campaign. US ASW programs, part of a Navy effort to combat Soviet submarines in general, have provided the added benefit of threatening Soviet strategic submarines in particular.

The US technical lead is narrowing, but US investments and superior operational capabilities continue to give us a significant advantage at sea. Recent statements by Navy leadership about US ASW programs should play on Soviet sensitivities and increase their uncertainties about the security of their SSBN force; again deterrence should be strengthened.

— Conversely, the US SSBN force today is extremely survivable at sea. No protective forces of consequence are required to provide protection for our SSBNs, which depend on stealth to avoid Soviet ASW sensors.

If Deterrence Fails, How Well Do US Forces Do?

31. There is a range of possible situations for which we need to assess the potential performance of US strategic forces against Soviet forces. For this assessment we consider a possible sequence of stages through which a war might pass. These stages are a period of crisis, the conventional phase of a theater war, a limited theater nuclear war, large-scale nuclear strikes, and continued operations in a succeeding phase of the war. In each circumstance, deterrence to some degree would have failed, although preventing further escalation would remain a major objective. We have compared US and Soviet forces to see how adequate they would be for each of these phases. Because measures were not generally established by which to judge the adequacy of strategic forces in each of these phases, we attempted to define a few. Major findings from analysis of each of these phases follow.

Crisis

32. When we speak of crisis, we mean a situation as severe as the 1962 Cuban missile crisis. We want the Soviets to avoid such a confrontation and to back down if one occurs. But the circumstances are different now from those in 1962. The Soviets are more likely to challenge us directly in areas favorable to them, and their belief as to whether they will need to back down may be different, given the change in the overall balance of power. This shift in the strategic balance creates an even greater requirement for the United States to be able to achieve timely local conventional military superiority at the focal point of any crisis. Even if we achieve this, there will remain the problem of nuclear escalation. US strategic forces will continue to provide indirect support in crises; their utility will be measured primarily in terms of their potential should crisis escalate to war, and primarily in terms of the perceptions the Soviets would have of that potential.

33. We want our strategic force posture, in a crisis, to be able to keep up with changes occurring in the Soviet force posture, and to be able to sustain higher levels of readiness and survivability at least as well as the Soviets. This serves the two objectives of contributing to the deterrence of Soviet escalation and being postured better for nuclear conflict should it occur. Consequently, we chose these proximate measures for our assessment:

— Changes in readiness and survivability to be expected from a transition to generated alert from the day-to-day posture.

— Time required to generate; time to detect opponent's generation; the impact of these time constraints on decisions to generate.

— Ability to sustain generated alert posture for extended periods.

34. Our major findings are:

— Generated alert greatly increases the expected numbers of survivable US strategic nuclear weapons because of the increase in bomber and SSBN readiness and dispersal. There would also be an increase in the survivability of general purpose forces if they dispersed. Thus there are incentives for the Soviets to try to strike the United States when our forces are at day-to-day alert, and there are incentives for the United States to generate forces in a crisis. We do not plan or posture for preemptive strike, but the Soviets may not believe this is the case and may be concerned for their vulnerabilities in a day-to-day posture.

— All online US forces, except for some SSBNs in transit, could be at full alert within 42 hours; most would be dispersed within 24 hours.

—

— US strategic offensive forces would be able to sustain extremely high alert levels for a month or two, and levels higher than normal peacetime alert over a much longer period. Soviet forces have similar capabilities.

35. Both the US and Soviet postures seem adequate to the stress of a serious crisis. Both sides maintain a sizable force on daily alert, and this force can be increased substantially and quickly under generated alert, which can be sustained for at least several weeks. Overall, a move from normal to generated alert profits the United States relatively more with respect to offensive forces, because of our heavy dependence on bombers and SSBNs, and the Soviets relatively more with respect to strategic defenses. Each side appears likely to detect changes in the other's alert status in timely fashion and is capable of responding appropriately. Two current asymmetries are notable. First, there is no US counterpart to the Soviet civil defense program, elements of which might be used (perhaps for signaling purposes) during a crisis. Second, there is no Soviet capability for global power projection comparable to that of the United States. Depending on the circumstances, these asymmetries may provide either side with a comparative advantage during a crisis. There is an uncertainty, however, in the effects of crisis fatigue on both personnel and systems, and whether these effects would degrade Soviet and American strategic nuclear postures differently. These factors could be a greater problem than the actual forces themselves.

Conventional Phase of a Global War

36. During conventional conflict, strategic forces and their potential for subsequent nuclear operations could be affected in several ways:

— Some strategic forces (primarily bombers and tanker aircraft) could be diverted to support the conventional war effort.

— Strategic forces and C³I might be subjected to nonnuclear attacks.

— Strategic forces would have to be sustainable at higher levels of alert than in peacetime, as was discussed in the crisis section.

37. Our strategic force posture objectives include those already cited for crisis situations, and, in addition, we want to suffer little degradation in strategic force capability as a result of losses or force diversions during conventional conflict. Measures of effectiveness we considered include: the ability of each side to use strategic forces in conventional wars, the effects of such use on potential for strategic nuclear missions, the survivability of strategic forces and supporting systems if attacked by nonnuclear means, the ability to atta strategic forces with nonnuclear means, and the abilit to sustain a nuclear alert posture during conventional war.

38. Our major findings are:

— Both sides would use strategic bombers in conventional campaigns, and we would use many tankers as well. Bombers used by both sides would be subject to attrition, Soviet bombers perhaps more than US bombers. However, the ability of the US bomber force to carry out strategic nuclear missions could be degraded by the diversion of US aerial tankers to support conventional air operations.

— There would be incentives on both sides to attempt to degrade the strategic nuclear posture of the opponent with conventional forces. There is no clear advantage for either the United States or the USSR independent of very sensitive scenario assumptions.

— The USSR appears better prepared than the United States for a campaign of attrition against theater nuclear forces in the conventional phase of a war.

— The Soviets would also probably try to destroy and interfere with some US strategic C³I, particularly forward-based and space-based installations that support theater operations.

— Paramilitary attacks and sabotage are a concern for both sides, but perhaps more of a threat to the United States because of our open society.

— The United States has an important potential advantage because of its capability to mount an ASW campaign that could directly shift the balance of strategic nuclear forces by attrition to the Soviet SSBN force in the conventional phase of a war

— Often overlooked in US strategic assessments is the problem of mobilizing industry for war in response to the threat that the war could escalate to nuclear attacks on homelands.

39. The US strategic posture seems generally more adequate than the Soviets' to the stresses of conventional war, primarily owing to the greater flexibility in the US inventory. At the same time, this greater flexibility may impose a price of reduced strategic capability, owing to the mission diversion of weapons systems (bombers, tankers, AWACS) during conventional conflict. Current improvement programs in these areas should substantially ameliorate the problem of diversion by the end of the decade.

40. Conventional war could reduce the strategic forces of both sides. Whether such attrition would be of a magnitude to alter severely the strategic balance is scenario dependent and conjectural. Therefore our assessment of possible changes in the balance is mixed. The United States is probably in a stronger position with respect to survivability of submarine forces, owing to our across-the-board advantage in submarine operations. We are, however, more vulnerable to the loss of critical space support systems, and we have greater vulnerability to unconventional disruption and sabotage.

Theater Nuclear War and Limited Nuclear War

41. Our concern here is with the capabilities of each side to undertake nuclear warfare at levels less than large-scale strikes on homelands. In such circumstances, strategic weapons might be used to support general purpose forces, deny military advances to the adversary, and coerce third countries. And strategic nuclear forces located ouside any sanctuaries would have to survive nuclear attacks as well as conventional war attacks. We are also concerned in this section with escalation to "limited" attacks on selected homeland targets.

42. The term "limited" has historically been used to define a wide range of attacks, from theater nuclear attacks against discrete target sets to counterforce attacks on homeland-based strategic nuclear forces.[1] In this section we consider two types of limited nuclear warfare: (1) nuclear warfare with superpower homelands as sanctuaries (theater nuclear war); and (2) nuclear war involving strikes against superpower

[1] Although in the past counterforce attacks on nuclear forces have also been considered as "limited" attacks, such attacks are considered large scale in this assessment and are not covered in this discussion.

homelands with relatively few (tens) weapons, detonated in areas other than large population centers, against military forces or isolated, critical war-supporting installations.

43. The US view has been that theater nuclear strikes could be limited in size and used to demonstrate resolve or fulfill a specific critical military objective that could not be accomplished with available conventional forces. Limited nuclear strikes could continue for some time at about the same level of intensity and scope, or might result in a rapid escalation process culminating in large-scale strikes. Theater nuclear strikes might also be large scale but limited to areas other than superpower homelands—either third countries or limited exclusively to the sea or outer space.

44. Our major findings are:

— Both sides appear to be able to conduct selective strikes against opponent's homeland-based forces and infrastructure. The material destructive effects that they would achieve might be quite high; however, the functional effects in many cases could be quite modest or the damage could have only delayed military effect. Both sides, unless their warning systems were to be degraded, would have the operational capability to discriminate small-scale attacks and probably to predict the general impact areas.

— US strategic nuclear forces are targeted against fixed installations, and most, if not all, Soviet forces are also so targeted. However, targets for limited nuclear strikes within theaters of conflict, particularly follow-on strikes, in large part would probably be mobile and would require near-real-time target acquisition, a capability which does not exist within the US or Soviet strategic forces today, except potentially in bomber forces. The use of strategic forces for area barrage against troops is another possibility, but one for which we have inadequate C³I. We can estimate physical damage to forces in the field.

— Of course, any US decision to launch a limited theater nuclear strike would be tempered by the reality that a similar or larger Soviet preemptive or responsive strike, including an intercontinental strike, might offset any transitory advantage to be gained by the US attack. The 400 SLBM RVs committed to SACEUR are already planned for theater use. Additional long-range nuclear forces might be required if our forward-based nuclear assets were attrited. In contrast to US dependency on some strategic nuclear forces for theater nuclear warfare, the Soviets are becoming less dependent. They are closer to most potential theaters of conflict, which permits their use of a wide variety of intermediate-range nuclear systems.

— The Soviets could strike US at-sea reinforcement and resupply shipping with nuclear ballistic or cruise missiles. In contrast, it would be more difficult for the United States to interdict Soviet resupply lines through Eastern Europe.

— We are uncertain as to what, if any, net alteration in the strategic balance might result from escalation to use of nuclear weapons against strategic nuclear assets in areas outside superpower homelands. US SSNs might be able to execute more damaging attacks against Soviet SSBNs using tactical nuclear weapons instead of conventional torpedoes, but could in turn also be subjected to nuclear ASW weapons by Soviet counterattacks. Both US and Soviet space-based assets are now quite vulnerable to nuclear weapons; however, both sides might be constrained from using nuclear weapons in space because of the risk of damage to one's own space-based assets.

45. Overall, the current mix of capabilities and vulnerabilities provides no general advantage to either side in limited strikes on each other's homeland.

Depending on the circumstances of particular strikes, each side could find itself without the capability to respond in kind to limited use of nuclear weapons by its adversary and therefore have to choose whether to back down or escalate. At present, however, the Soviet Union enjoys some advantage in conducting nuclear strikes against geographically proximate theater targets because of the large number of highly capable SS-20s. The United States could conceivably redress this competitive advantage by deploying matching INF capabilities, or by developing improved operational capabilities, including reloads, for using intercontinental systems in theater missions; the former possibility is heavily influenced by NATO's reluctance to accept larger INF deployments.

Large-Scale Nuclear Strikes

46. Three generic types of large-scale nuclear strikes are:

- Counterforce strikes, which are directed at opposing nuclear forces.
- Countermilitary strikes, which are directed at opposing nuclear forces, conventional power projection forces, and their command and control and supporting infrastructures.
- Countervalue strikes, which are directed at opposing industrial capacity.

Pure counterforce or countervalue strikes might not be practical or easily distinguishable in the actual event; our classification is strictly for purposes of analysis.

47. The literature of strategic nuclear warfare is rich with discussions of these types of attacks; US strategic thinking has been focused on them for several decades. US analysis of strategic warfare to a great extent has been focused on the hypothetical effects of large nuclear strikes against counterforce and industrial targets, and, to a much lesser degree, on the results of countermilitary strikes. Results have usually been expressed in terms of blast damage expectancies against sets of targets, and in residual weapons remaining after large strikes by one or both sides. There was a time in the mid-1970s when US strategy called for targeting Soviet industrial and economic targets so as to prevent the Soviets from recovering economically as fast as the United States could.

Even less attention has been paid to the effects of large nuclear strikes on the subsequent relative abilities of the two sides to project military power outside of the homelands. Our past neglect of capabilities for military operations after an initial massive strike stemmed from our commitment to a strategy of mutual assured destruction and our reluctance to think seriously and in detail about how to conduct military operations should deterrence fail.

48. For many years we considered the strategic posture as essentially adequate if it provided us a high-confidence ability to withstand a massive Soviet first strike and retaliate with forces capable of inflicting severe damage on the Soviet population and industry. Insofar as both the United States and Soviet Union had little difficulty in developing such a capability against inherently fixed, soft targets, the requirements of mutual assured destruction were considered (by high-level policymakers and the Congress) to have been met, and we paid relatively little programmatic attention to developing capabilities to serve political and military goals after the initial strikes against homelands.

49. Indicators of the strategic balance with respect to large-scale nuclear warfare include:

- The extent to which strategic forces and supporting systems can destroy preplanned targets.
- The extent to which strategic forces and supporting systems can survive a nuclear attack against them.
- The extent to which strategic offensive and defensive forces can limit damage.

50. Our major findings are:

- US strategic system survivability is highly scenario dependent. The two most critical variables are the alert posture—either generated or day to day—and the launch timing—for ICBMs, initial strike, launch-on-warning, or rideout.
- The Soviet Union could not destroy most of the US nuclear forces, if we were in a generated alert posture, because most of our SLBM and bomber forces would survive. The US leadership and C^3 is vulnerable to a surprise Soviet strike and is probably fairly vulnerable under generated alert

as well. The Soviets, however, could not be sure of decapitating US leadership or of disconnecting the command and control of military forces to prevent timely US retaliation, especially with the United States in a generated alert posture after days or weeks of prior conflict.

— The Soviets have a clear preference for preemption if they believe the conflict is going to escalate, but we do not know what would convince them that a US strike was imminent. Even if we struck first, the Soviets could almost certainly retaliate with a major strike, although there could be some serious degradations and delays.

— US forces cannot adequately destroy Soviet nuclear forces, leadership, C³I, and power projection forces. The United States cannot effectively target the mobile or movable Soviet forces and supporting systems,

US targeting might be adequate only to damage, but not destroy, many specific Soviet military capabilities. Some Soviet systems, if only moderately damaged, might be repairable enough so that significant operational capability could be restored relatively quickly.

—

Our inherent capability to destroy much of their critical war-supporting industry is high, although current targeting priorities would limit the actual damage achieved.

— As a matter of policy, the United States has chosen not to develop and field any significant level of strategic defense, and thus will continue to remain relatively weak in the ability to ensure the survival and operability of effective US military forces and command functions in the event of a massive Soviet nuclear strike. This policy may change as a result of the President's initiative for improving strategic defense.

— US power projection capabilities, war-supporting industry, critical energy systems, and population are extremely vulnerable to a massive Soviet nuclear strike, no matter what the alert posture, because of our lack of passive defenses.

51. Therefore we can summarize our assessment of the large-scale nuclear strike phase of a conflict as follows:

— Soviet ability to limit damage is relatively greater, and the United States would suffer heavier damage than would the Soviet Union in any large nuclear exchanges.

— The Soviet Union would in most scenarios retain a larger number of nuclear weapons after any series of large-scale strikes, but the difference is not likely to be so significant as to be the dominant factor in the outcome of the conflict.

— The effects of such strikes on the will of either party to continue a global war is conjectural; such effects may be much more important than the material damage to military power projection capabilities, which probably would be asymmetrically less for the Soviets than for us.

52. Tables 1 and 2 summarize our assessments of large-scale nuclear warfare capabilities of the two sides for the years 1983 and 1993, from the perspectives of both a US planner and a Soviet planner. The tables assume that future Soviet programs and capabilities actually eventuate along the lines of current national intelligence projections, and US programs proceed as currently planned.

53. The Soviets, in our view, have some clear advantages today, and these advantages are projected to continue, although the differences may narrow somewhat in the next 10 years. We believe, however, as shown in table 2, that the Soviets would not see their advantages as being as great as we would assess. Moreover, even in our assessments the Soviet advantages, while significant, would not appear to be great enough for us to be concerned that we no longer have the capability to deter large-scale nuclear war. Clearly we still do. The uncertainties in all of this still would make it unattractive for the Soviets to escalate to such a level of warfare; they could not expect with high confidence to prevail. As noted in chapter III, we are greatly concerned, however, for the effects of these imbalances on the behavior of the two sides in crises and conflict situations.

Table 1

Large-Scale Nuclear Warfare Capabilities[a]
A US Planner's Assessment

Capabilities	1983 Perceived Adequate for US?	1983 Perceived Adequate for USSR?	Relative Advantage 1983	Relative Advantage 1993
Ability, with large initial strike, substantially to destroy opponent's:				
Nuclear forces	No	No	Soviets	Soviets
Leadership	No	Perhaps	Soviets	Soviets
C³I	No	No/perhaps	Soviets	Soviets
Power projection to Europe	No	Yes/probably	Soviets	Soviets
War industry	Yes[b]	Yes	Soviets	Soviets
Critical energy	Yes[b]	Yes	Even	Even
Survivability of own nuclear systems against large-scale attack				
ICBMs	No	Probably/yes	Soviets	Soviets
SLBMs	Yes	Yes[c]	Even	Even
Bombers	Yes	Perhaps	United States	United States/even
C³I	No	Probably	Soviets	Soviets
Ability of own defenses to limit damage				
Active systems	No	No	Soviets	Soviets
Passive systems	No	No/perhaps	Soviets	Soviets

[a] For purposes of this table, the assumed alert posture is generated alert for both sides prior to the strikes.

[b] We have the inherent capability, but current targeting priorities would limit the actual damage to such targets and consequently they might not be substantially destroyed.

[c] Soviet SLBMs at sea in generated alert are largely survivable against a sudden strategic nuclear attack, as depicted here, but are still vulnerable to attrition over a period of days or weeks from US ASW.

Extended Strategic Nuclear Operations

54. The use of strategic nuclear weapons during general conflict could extend beyond one or two major strikes. If we had military capabilities that caused the Soviets to lower the odds that they could prevail in an extended conflict, we would have much greater confidence in our ability to deter Soviet actions that could lead to such a conflict.

55. US objectives in a period of extended conflict would be to preserve our power and influence and to terminate the hostilities on as favorable terms as possible. Two Soviet goals would be to isolate the theater of ground warfare from further US resupply and reinforcement, and to limit further damage to the Soviet homeland.

56. Our major findings are:

— While neither side can be confident of its capabilities to prosecute extended nuclear operations after major strikes on homelands have occurred, the Soviets currently are better postured with respect to survivability and endurance.

— The Soviets would probably have a larger force available after a series of nuclear strikes, and

Table 2

Large Scale Nuclear Warfare Capabilities[a]
A Possible Soviet Planner's Assessment

Capabilities	1983 Perceived Adequate for US?	1983 Perceived Adequate for USSR?	Relative Advantage 1983	Relative Advantage 1993
Ability, with large initial strike, substantially to destroy opponent's:				
Nuclear forces	No	No	Even	Even
Leadership	No	Perhaps	Soviets	Soviets/even
C³I	No/perhaps	No/perhaps	Soviets	Soviets/even
Power projection to Europe	No	Yes/probably	Soviets	Soviets
War industry	Yes	Yes	Even	Even
Critical energy	Yes	Yes	Even	Even
Survivability of own nuclear systems against large-scale attack				
ICBMs	Probably	Probably	Soviets	Soviets
SLBMs	Yes	Perhaps[b]	United States	United States/even
Bombers	Yes	Perhaps	United States	United States/even
C³I	Perhaps	Perhaps	Soviets	Even
Ability of own defenses to limit damage				
Active systems	No	No	Soviets	Soviets
Passive systems	No	Perhaps	Soviets	Soviets

[a] For purposes of this table, the assumed alert posture is generated alert for both sides prior to the strikes.

[b] The Soviets could be worried that the United States has the ability, with its superior ASW forces, to preempt Soviet SSBN forces with a sudden attack. Soviet submarines are probably considered vulnerable to attrition over a period of days or weeks from US conventional or tactical nuclear ASW attacks.

they currently have substantially more potential overall capability for reconstitution of strategic missile forces.

— As little as 10 percent of the online US strategic force, either withheld or having failed to launch, might be available following the initial large-scale strikes. Estimates of surviving and reconstitutable US bombers after execution of the SIOP range from 50 percent to as low as 10 percent—bombers that might be interned in neutral nations being the major uncertainty. Very few ICBMs would remain. SSBNs, some empty and some loaded, would survive. Endurance problems could reduce the numbers of available forces within a few days to weeks.

— Communications would have to be reconstituted for controlling the SSBNs, bombers, and any surviving ICBMs, using dedicated reserve C³ capabilities, which are fairly minimal, or assets normally not dedicated to strategic forces, such as general purpose military equipment or commercial radios.

These problems, coupled with a reduced inventory of available nuclear weapons, might force us to consider entirely different operations in any conflict stage following homeland attacks.

57. The most important recent development is that US military planners are beginning to think seriously about protracted, or extended, warfare. This could lead to innovation over the next decade in tactics and operational plans for employing our forces. The emergency targeting team of the Strategic Air Command and the Joint Strategic Target Planning Staff is one example of such actions; work on continuity of government should also enhance the likelihood that both centralized US governmental control and at least some military commands would survive through a protracted war, making more effective command and control of US strategic forces likely.

58. Our new strategic forces over the next few years should permit increasing the size of the strategic reserve forces. Other US efforts on C³I survivability should also improve our extended war-fighting capability. The critical US C³I deficiency is likely to continue to be a lack of enduring ability to locate and target movable Soviet assets. Some important efforts to increase our ability to reconstitute the bomber force have been initiated recently, but much more could be done. Although the SSBN force is inherently the most survivable and enduring delivery system, little has been done to provide enduring weapon-reload capability.

62. The trends do not appear to be significantly reversing this situation. Although US investment will be substantial over the next decade, Soviet investment will also be considerable, will be more comprehensive, and will build on 20 years of previous investment. The United States has not funded any significant level of

Table 3

US Perception of the Ability of Either Side to Accomplish Its Objectives in the Event of Global Nuclear War

US Objectives	1983 Can We Achieve?	1993 Will We Be Able To Achieve?
War termination on relatively favorable terms	No	Probably not. If Soviets can maintain political control they would be in more favorable position after large strikes. They would retain advantages in major theater war.
Isolate theaters from opponent	No	No. US policy in this direction, but no significant mobile targeting capabilities.
Limit damage to homeland	No	No. US passive defense program not significant; active defenses still marginal.
Soviet Objectives	**1983 Can They Achieve?**	**1993 Will They Be Able to Achieve?**
Prosecute global war to favorable outcome	Perhaps yes, but not confident	Depends heavily on US C³I improvements. May sense gain from improved passive and active defenses. Much depends on the extent of US offensive improvements in hard target kill and mobile targeting capabilities. Depends on uncertain ability to sustain control despite damage.
Isolate Eurasian theater of war from US power projection	Probably	Probably
Limit damage to homeland	Not enough; somewhat, for war-fighting capabilities	Somewhat better than now; still not acceptable. Improved if active defenses are deployed and prove effective against new US penetrators.

strategic defense and thus in 1993 will still remain highly vulnerable to a Soviet massive nuclear strike. We will remain incapable of achieving our currently declared objectives unless survivability of all military forces, C³I, and the civil sector is markedly improved in the 1980s. The result is the prospect of perhaps a narrowing but continuing relative advantage for the Soviet Union should nuclear war escalate to this level.

63. The Soviets would evaluate their own prospects for achieving their objectives as being worse than we credit them in our evaluations. They are highly concerned, and, in our view, apt to be overly pessimistic about:

- The capabilities of US ASW against their submarines.
- The effects of new US programs on overall US capabilities.
- Their ability to degrade US command, control, and communications sufficiently to prevent a large-scale, well-coordinated retaliation.
- Their own ability to maintain continuity of command and control throughout key phases of a conflict.

III. CONCLUSIONS AND JUDGMENTS

64. Assessment of the strategic balance is the most difficult and complex of all the military balances. This contradicts the view held in most circles for many years that this subject is analytically more tractable than the admittedly complex operations of combined arms in theater warfare. The strategic balance cannot be measured in isolation from theater balances because nuclear forces must be assessed in the context of conflict situations in which all forces are being used.

65. Computer simulations of warfare cannot provide reasonable predictions of actual outcomes for any kind of conflict; in the end, all assessments of military balances depend on experience and judgment. For most kinds of warfare we have relevant historical experience and, in particular, we have military men who have experience in warfare similar to the kind whose outcome we try to assess in analyzing the military balance. No one has ever experienced large-scale nuclear war, however, and thus strategic balance assessments are correspondingly more difficult.

66. We hope never to have that experience. The fundamental purpose of our strategic forces is the influence they exert on Soviet assessments and through them on Soviet behavior. They are also important for the role they play in support of our allies and in the cohesion of our alliances, a matter which we only touch on in this assessment because we have not directly examined the perspectives of our allies.

How Adequate Is the Balance?

67. Is the balance adequate to deter a direct nuclear attack on the United States or a major attack on Europe? Probably yes. Soviet assessments of the outcome of a large-scale conflict that is likely to include direct attacks on the United States and its major allies, and attacks on the Soviet Union, are probably sufficiently unfavorable or risky to deter them. But we should ask a different question: has the shift in the strategic balance that has taken place over the last 15 to 20 years made the Soviets more hopeful, more willing to try to coerce the Europeans, and to try to split them from the United States? The answer in this case is yes. The shift in the balance—not only the strategic balance, but the growth in overall Soviet military power unmatched by the West—not only gives them an increased incentive to pursue such policies but provides a background of power from which direct threats, active measures, and cultivation of the Europeans can proceed more effectively. This strategy is paying off; many Europeans have been edging toward a position of neutrality between the great powers, a shift which has coincided with the buildup of Soviet strategic forces and of other Soviet forces focused directly against Europe.

68. The United States assumed its current role in the world and structured its major alliances during the period of US superiority in strategic nuclear forces. When the decisions were made in the early and mid-1960s to settle for parity, parity itself was seen by some as a good thing in itself. The full consequences of strategic parity for the overall military balance with the Soviets, for our position throughout the world, and for the cohesion of our alliances over the longer run have not yet been fully realized.

69. One such consequence is that the range of Soviet actions we can deter has undoubtedly narrowed, especially in areas of the global competition less critical than Europe. The Soviets have been exploiting soft spots in the Third World more aggressively and they almost certainly feel freer to assert themselves in a range of lesser contingencies. This is a fundamental change from the relative caution they exhibited until around 1970 (with the important exception of moving missiles to Cuba in 1962). Greater Soviet assertiveness in the Third World was almost certainly encouraged by the paralyzing effect of the Vietnam war on our ability to counter these Soviet moves, but Soviet confidence in acting was probably increased by their knowledge of their greater strategic power.

70. It is difficult to judge the adequacy of the strategic balance when one poses the issue in terms of the likely behavior of the Soviets, our allies, or—for that matter—ourselves, in periods of increased tension. We will only know when a test occurs. And there is a heightened possibility that the Soviets may in the future challenge some US interventions in crises, particularly those involving actions against a friendly or client state. They might do so not because of a greater propensity to take risks (although they may now feel more confident about risk taking) but mainly because they now expect *us* to be more inclined to play it safe and avoid risks. It seems prudent for us to pay more serious attention than we have to Soviet counteractions in possible crises, especially in parts of the Third World where the Soviets have interests and where their capacity to project military power is strong. (Southwest Asia is an especially important case in point.)

71. More specifically, it would seem imprudent to slight the importance of real capabilities in shaping the course of crises and conflicts. The people in our military forces, government, and population at large must have faith in our forces, weaponry, and plans; if not, there is a risk of loss of nerve in a crunch. A major crisis, analogous to the 1962 Cuban missile crisis, in

which the United States had to back down as the Soviets did then, would produce a massive shift in the perceptions of US strength relative to that of the Soviet Union in the eyes of the US public and of other nations.

73. If deterrence fails to one degree or another, the issue of the adequacy of the balance divides into the adequacy during the various possible phases that precede, constitute, and follow initial large-scale nuclear strikes. During a crisis, and in conflict prior to large-scale nuclear strikes, the US relative strategic position would probably improve over the peacetime situation with the generation of the full US bomber and ballistic missile submarine forces and the deployment of our attack submarines, which are capable of attriting a large part of the Soviet SSBN force. In the early phases of large-scale nuclear war the situation would be unfavorable because of the comparative vulnerability of US command and control, which we are now trying to correct, and the asymmetries in counterforce capabilities against hard targets. For the phase of extended strategic operations, the United States is probably in an even less favorable situation. The Soviets currently are postured better with respect to survivability, endurance, and force reconstitution.

74. The relative weaknesses are the results of past asymmetries in US and Soviet policies, missions, and investments. As US programs come to fruition, the situation in these different phases will improve somewhat over the next decade or more, and there will be some movement in a direction favorable to the United States. The changes in policy and planning are as important as the increased investments. As our military planners actively think and plan for wars as integrated conventional and nuclear operations, we will develop more effective tactics and operational concepts that will permit us to pursue counterforce operations from the conventional phase through the extended nuclear phase of a possible war.

How Much Do US Programs Help?

75. Renewed US efforts over the past several years will slow the erosion in the relative US position. However, we should not be overoptimistic and assume the effects will be immediate. It will take a long time, and a persistent effort, to redress the deficiencies in our currently inferior nuclear posture. Nevertheless, the Soviets show signs already of being concerned about our turnaround and the possibility that their gains of the past two decades may be eroded in the future.

This achievement will ameliorate a critical US vulnerability and, even more important to the Soviets, the effort signals greater American seriousness about competing in the strategic force arena than has been evident for many years.

76. Other US programs that appear to have major impacts on the Soviets are missile accuracy improvements, which move us toward having a prompt hard-target kill capability, manned bomber modernization programs (after several decades of aborted modernization attempts), and our several cruise missile programs. From the Soviet perspective, the problem is not that these programs promise to tip the balance right away. Years of high Soviet investment in strategic programs, paralleled by years of low US investment, have given the Soviets an inventory of weapons and an R&D and

production base that will take us years to offset. But the US programs do make a difference to the Soviets, both technically and as a demonstration of greater US willingness to compete, and the Soviets must fear that we will follow with the introduction of new technologies that would render the entire Soviet strategic posture much less effective. Three technical possibilities that must worry them greatly are: stealth technologies that promise to render obsolete much of their vast air defense network; continued ASW advances that threaten their SSBNs; and the possibility that we will make a breakthrough in ABM technology that could greatly reduce the effectiveness of their ballistic missiles.

77. From the Soviet perspective, the best way to avert these dangers is to try to prevent the United States from carrying through with these programs. They hope that domestic opposition in the United States and Western Europe to the MX, INF deployments, and investments in "nuclear war-fighting" programs will slow or stop the US momentum; they also try to help such opposition through active measures, diplomacy, and the arms control process.

Arms Control Aspects

78. The aims of arms control should not be separate from those of our overall security strategy: to diminish the likelihood of nuclear war, limit the spread of nuclear weapons, make arsenals less costly and destructive, channel forces into stabilizing paths, and contribute to support of our international political goals.

79. In reality, we have tended to regard arms control goals as distinct from those of our military strategy. We have assumed that we and the Soviets had *mutual* arms controls interests which overrode whatever *opposed* interests we had in the military arena. While we have attempted to promote this distinction and hierarchy, it is striking how different is the Soviet perspective. It has become evident in the past decade that the Soviets see little symmetric or mutual benefit from arms agreements. Some of the main points of difference in perspective are:

— Their world view is dominated by conflict, and arms control is, for the most part, an instrument in the struggle.

— We depend disproportionately on our nuclear forces, as the result of our original superior nuclear position, to block them—mainly in Europe, but also elsewhere. Therefore, eroding the credibility of our nuclear strength by any and all means has been and is a central Soviet strategic aim. Arms control agreements on nuclear weapons are a key element in their strategy, one on which they made great progress in the 1970s. A principal Soviet aim has been to drive a wedge between the United States and its allies and shift Europe toward neutralism. This objective is their principal aim today in the START and INF negotiations.

— There are some areas in which the Soviets do perceive mutual interest (for example, keeping radioactivity out of the atmosphere, avoiding incidents at sea, and nonproliferation).

80. The Soviets have pursued a dual-track approach to arms control. They seek agreements which will halt or slow US strategic force deployments, while continuing an across-the-board buildup and modernization of forces not limited by agreements. In negotiations they try to tailor any agreement to conform to their narrowly defined goals:

— They have no interest in the "spirit" of the agreement. In the 1970s, while learning to play back to us American-style rhetoric about the destabilizing character of the "nuclear arms race" and the dangers of war through inadvertence, their expenditures on nuclear systems and new systems developments proceeded on course.

— They have specific weapon systems of their own they want to protect (for example, SS-18s) and US weapons they want to eliminate (MX and Pershing II). Up to now they have not been willing to forgo any of their major programs in order to get us to drop our own programs.

— The Soviets' preferred way to gain advantage is to have their adversaries' populaces put enough pressure on their own governments for these governments to make unilateral reductions or denials (for example, ABM, MX, Pershing II, GLCM). This requires the Soviets to concede nothing.

— They will cooperate in, or insist on, leaving out of an agreement weapons categories that they especially value (for example, in SALT, they argued to exclude Soviet systems threatening Europe while including US "Forward-Based Systems" capable of hitting the USSR; they also protect reloads for strategic missiles by arguing that nobody would have such things, hence there is no need to cover reloads in an agreement).

— For those weapons systems that are included in agreements, they closely define parameters to be protected. (For example, in SALT I they refused to agree on a definition of heavy ICBMs that would have prohibited deployment of new SS-19 missiles much larger than those SS-11s they were to replace.)

81. Similarly, when an agreement has been reached the Soviets interpret its provisions in ways that offer maximum latitude for them to achieve an advantage:

— They pay close attention to wording and tend to prefer exploitable ambiguity in language (for example, their exploitation of ambiguity in the language in SALT II limiting encryption of telemetry, and the criteria for determining new type of ICBMs).

— They exploit limitations in monitoring (for example, the use of mycotoxins in Southeast Asia and Afghanistan; the release of biological agents in Sverdlovsk; the presence of SS-16s at Plesetsk; concurrent testing of ABM and air defense at Saryshagan).

What are the Characteristics of Strategies for Competing More Effectively With the Soviets?

82. The strategic programs the United States is now pursuing have a more competitive character than has been typical since the mid-1960s. Continued development and refinement of strategies for competing more effectively for the rest of this century seem desirable. In any case, we need to be efficient competitors so as to limit the resources required.

83. Our strengths lie in military sectors in which our forces remain superior (such as submarine operations); a much larger, more dynamic, and more balanced economy; more advanced technical strengths in many areas; a culture which encourages innovation, flexibility, and adaptability; a resilient political system; and a set of alliances based on voluntary association, which possesses many actual and potential strengths. The Soviet strengths are the existence of a larger capital stock of weapons in many important categories; an ability to sustain policies and programs over decades relatively unencumbered by pertinent political opposition; a growing technology base; an arms control approach designed to restrain the competitive will of its adversaries; and an ability to act swiftly if necessary.

84. If we pursued a more competitive strategy that builds on these observations, we would be adopting a geopolitical and military strategy which sees competition with the Soviets as a continuum and does not conceptually isolate theaters of conflict or modes of conflict. Such a strategy might include the following elements. We could:

— Have evolving strategic offensive and defensive postures that are so diversified and complex as to pose difficult problems of attack to the Soviets, postures strengthened by more emphasis on survival, wartime endurance, and robust C³I.

— Impose new costs on the Soviets by exploiting our advantage in high technology to introduce qualitatively superior new US weapon systems in selected areas, which could render obsolete large Soviet investments and cause them to react in ways costly to them but not to us (for example, air defense).

— Change the perception of arms control as a solution to our strategic force problems to a perception of it as an adjunct to our strategy for competing with the Soviets. Arms control does not obviate the need for aggressive pursuit of strategic modernization—a lesson we have learned from SALT.

— Give more thought to the roles of US allies and China, including possibilities of selectively bolstering their nuclear capabilities.

— Explicitly recognize and prepare for a possible confrontation with the Soviet Union in the 1980s that could come out badly, thereby producing pressures for a rapid, large expansion in the defense budget.

85. ***Strategic Posture.*** On the whole, we are essentially on the right track. Rebuilding our strategic forces and greatly strengthening our wartime C³I systems are essentials for dealing with the Soviets in the years ahead. The changes the Soviets have brought about in the balance, however, make it evident that it will be a difficult task, even if the necessary domestic support is sustained.

86. We could do more to impress the Soviets with the consequences of our modernization. Their "correlation of forces" approach to assessing the balance incorporates a wide range of military, technological, economic, and political factors. We could build on our programs—which have created some uncertainty in their minds about how well they will be doing in the future—by doing additional things to convey to the Soviet leadership a renewed sense of American strength and confidence. For example, we could do much in our military exercises to convey our intention to prosecute any war, including a large conflict in which nuclear weapons are used, so as to convince the Soviets that they would end up in an inferior position. We could show in a variety of ways that we judge that we have enduring C³I systems and robust delivery systems. We could show how in a major conflict we intend to improve the situation on the ground in Europe or elsewhere, a US aim to which the Soviets would be particularly sensitive. We might demonstrate qualitatively new capabilities, such as the launch of a communications satellite from a submerged submarine in simulation of a postnuclear attack rebuilding of C³I capabilities.

87. Over time, we may find it necessary to exploit the inherent advantages of having diverse types of nuclear forces—the principle of today's Triad—by developing a more varied posture that will impose on the Soviets a requirement to counter a larger, and more rapidly changing, set of unique problems. The case for a small, mobile, highly accurate ICBM is a good one. We might want to introduce still other offensive delivery options that would complicate Soviet attack planning problems. We will have a variety of sea-basing options for cruise missiles. On the basis of our new emphasis on strategic defense, we might find it desirable to shift our investment more toward ballistic missile and air defenses, and passive defenses.

88. ***High-Technology and Cost-Imposing Tactics.*** A major area of continuing competition should be in new technologies. The advent of truly significant technologies may make the 1980s and 1990s more like the 1950s in this respect than the technologically more stable 1960s and 1970s. These may offer the prospect of rendering obsolete parts of the large capital stock of weapons in the Soviet arsenal. Missile accuracies can be improved by both sides to the point where errors are essentially zero. The Soviets depend much more than we do on vulnerable silo-based ICBMs and thus they have more to lose from the development of highly accurate missiles. Partly as a result of improved accuracy, it is likely that a progressively larger proportion of the strategic forces of both sides will become mobile for survivability. We need to strive to maintain the survivability of our sea-based ballistic missile force *and* the vulnerability of the Soviet one. The Department of Defense is proposing to explore vigorously a variety of potential ABM technologies. Stealth technologies continue to offer a very promising prospect. Space will become a more intense region of military use and competition; in space, we need to pay more attention to having usable wartime capabilities that account for the possibility of Soviet attack on our space assets.

89. We could also profit from playing on Soviet fears about our technical prowess. The President's speech of 23 March 1983 proposing defenses against ballistic missiles has probably had such an effect. While we do not want to reveal specific capabilities that should remain secret, we might identify critical areas in which we want the Soviets to be impressed by our capabilities, or make them think we are more advanced in such areas (or are coming along more quickly) than in fact we are, or heighten their uncertainty about what we have. Examples include the ability to deliver missiles with high accuracy from submarines, the high efficacy of Stealth, and the extraordinary power of our ASW capabilities.

90. ***Arms Control.*** The United States has long been willing to wind down important aspects of the nuclear competition. In fact, we did so unilaterally after

deploying the Triad. The Soviet leadership continued their strategic force modernization programs and, in effect, took advantage of our unilateral restraint. They show no sign of easing off on their strategic investments. But we should persist in proposing to limit and contain this competition. At some point, a change in Soviet perception, perhaps influenced by internal economic needs, may produce a greater willingness to scale back. However, the probability of this happening is very dependent on our willingness to compete vigorously with them in the interim. In any case, there is little reason to believe that any likely future Soviet leadership will want to seriously risk involvement in a nuclear war. They (like we) will almost certainly see this class of weapons as relevant mainly in influencing power relations around the world. They will also persist, however, in taking out insurance for the possibility that a nuclear war might happen.

91. One important implication of the record of arms control experiences with the USSR is that in the long run, much more limited agreements, more readily verified, may be more feasible than the comprehensive kind that we have been seeking (for example, more like the atmospheric nuclear test ban rather than SALT or START). In this case, arms control could partially constrain the Soviet Union, but there would be no illusion that an agreement is a panacea for the strategic competition—the illusion that attended SALT I and SALT II.

92. Technology is eroding the basis for some existing agreements. For example, Soviet nonnuclear, as well as nuclear, tactical ballistic missiles of short and medium range are emerging as a significant threat to Europe, and the potential upgrade of our Patriot air defense missile system to enable it to intercept Soviet short- and medium-range missiles will have to be evaluated by the Department of Defense. The Soviets have been testing, and soon will deploy, the SA-X-12, an advanced air defense missile capable of intercepting tactical, and perhaps strategic, ballistic missiles. On balance, it may be better to allow the technological competition to proceed here rather than try to stop it in the dubious belief (not shared by the Soviets and rejected by the President in his strategic defense initiative) that active defenses are bad per se.

93. ***US Allies and China.*** The largest unsolved problem created by the growth of Soviet nuclear power concerns the strategy for the defense of Europe. The United States and its allies have sought a cheap defense based on the threat of nuclear escalation, but the growth in Soviet strength has eroded the basis for such a strategy. No adequate alternative has emerged: the Europeans have not been willing to spend the money for a strong nonnuclear defense, nor does there exist a cohesive political community able to create a European nuclear deterrent force. Meanwhile, the pressures grow on the United States to do more to cope with challenges outside of Europe; there is no adequate substitute for the United States dealing with many of these Third World challenges.

94. There are several possibilities for the future defense of Europe, including a change in the willingness of the Europeans to invest in their own security, a greater "European" defense role for the British and French nuclear forces, and a conscious exploitation of instabilities in Eastern Europe. It is conceivable that at some point we may be forced by pressures elsewhere to leave much of Europe's defense to the Europeans. At that stage, it might be necessary to consider transferring much more—or all—of the responsibility for nuclear defense to the Europeans. This could entail a large-scale transfer of strategic technology to the Europeans. Even so, left to themselves the Europeans would probably be militarily dominated by the Soviets; but their prospects probably would not be as desperate if there were continuing technical and other types of help from the United States.

95. Events might also at some stage make it feasible and desirable for us to provide great help to China in improving its military posture, including possibly its nuclear forces. The uncertainties in China's political stability and its foreign policy orientation are such that substantial risks would be involved in providing such assistance. We would presumably have to be in a very difficult situation vis-a-vis the Soviet Union for this to be an acceptable course of action.

96. ***Contingency Preparation.*** What might happen if war occurred? It is folly to try to predict the course of such a conflict in any but the broadest outlines. However, we certainly would have to be prepared to suffer great damage to our population, industry, and military forces, as would the Soviets. They have, however, taken more precautions than we to try to survive. In particular, they have done much more to try to preserve political control, a priority which is essential for the leadership of a totalitarian

system. The Soviets would also be particularly concerned at assuring the preservation of their control over Eastern Europe.

97. In considering escalation to the use of nuclear weapons, and especially large-scale use, we need to pay much more attention than we have to those cases in which there is a gradual escalation of warfare up to a large-scale nuclear strike, and in which there is a major theater conflict.

98. Escalation to a highly destructive intercontinental level is by no means inevitable once theater nuclear strikes occur, but in fact we have little confidence in predicting what would happen. In such a conflict the Soviets would of course prefer to avoid attacks on their homeland, which would be highly destructive and which could shake their political control of their people. Faced with a prospect of US escalation to the intercontinental level, there is a chance that the Soviets would back down. They have a strong preference, however, for preemption and decisive strokes. If they thought they could accomplish their theater objectives—the original purpose of their aggression—while limiting damage from a retaliation against their homeland, they might undertake a preemptive strike against the United States. The chances that they would try to preempt would be increased by a combination of a fear of loss of their empire and of political control at home, if they backed down, coupled with a perception that the United States might not have the resolve or capacity to launch a large retaliatory strike.

99. The Soviets would stand a good chance of succeeding in controlling events in Europe and much of Asia after a war of this magnitude. The United States would be at a profound disadvantage in the postwar period in exerting influence on the Eastern Hemisphere.

100. If we were to pursue a more competitive strategy, it would conflict with the ethos in a sizable portion of US political leadership and the media—although perhaps not as much in the general public. Ironically, it would be objected to by many in allied countries even though they are the main beneficiaries of a stronger US posture. The Soviets would become more upset if they perceived that a profound change was occurring in the US commitment, and their possible countermoves would be seen as highly threatening by many in this country and in Europe. An essential component of a more competitive strategy would be continuing public exposure of Soviet actions which clearly show their commitment to superiority in military power as their principal asset in the competition with the United States, their use of arms control in their pursuit of competitive advantage, and the growing evidence of noncompliance with arms control provisions as an indicator of their disdain for our concept of the purpose of arms control.

ANNEX

SOME KEY TRENDS AND ASYMMETRIES

Strategic Offensive Forces

1. ***Delivery Vehicles:*** Since 1970 the number of US delivery vehicles has gradually declined by about 20 percent. The Soviets leveled off later, in the mid-1970s, and have not reduced their numbers, thereby gaining a lead of about 600 delivery vehicles; they now have almost 2,500 vehicles (not including Backfire bombers). The Soviet advantage in delivery vehicles could grow to over 1,000 by the early 1990s, primarily because of mobile ICBM deployments, unless there is a START agreement, continuing Soviet restraint to SALT II–sized forces, or a US strategic program greater than now proposed by the administration.

2. ***Ballistic Missile Throw Weight:*** The Soviets have emphasized large land-based ballistic missiles, while we have placed greater emphasis on bombers and SLBMs. These differences have resulted in the Soviets' increasing their lead in ballistic missile throw weight since 1968; the gap is now over 3:1.

Improved technology and more missiles could increase aggregate Soviet ballistic missile throw weight 40 to 70 percent by the early 1990s. Programed US missile deployments would not significantly close the gap. US START proposals would reduce Soviet throw weight by about 50 to 60 percent from its current level; the Soviet proposal would result in a small decrease.

3. ***Deployed Weapons:*** In 1965 the US strategic weapons advantage over the USSR was 6,000 to 600. The US count has grown but the Soviets have considerably narrowed our lead. These weapons are distributed quite differently, as shown in the table.

Deployed Weapons, October 1983[a]

	US	USSR
ICBM	2,100	6,100
SLBM	4,100	1,300
Bomber	2,700	400
Total	8,900	7,800

[a] Does not include weapons for SSBNs in overhaul, or ICBM silos under modification.

Depending on their level of effort over the next decade, with a decision to expand beyond any arms control constraints, the USSR could have between 14,500 and 23,000 by 1992. If MX and ALCM programs are not reduced, the US count would be about 15,000 by 1992, in the absence of arms control constraints.

4. ***Hard-Target Kill:*** Before the Soviet deployment of their current generation of ICBMs, neither side had enough ballistic missile warheads with yield and accuracy combinations sufficient to threaten the opponent's silo-based missile force. The Soviets now have 4,300 such ICBM weapons, enough to destroy 75 to 80 percent of the 1,140 US ICBM silos and launch control centers (LCCs) in a well-executed attack; they will have 6,000 by 1985. Minuteman III is not nearly so effective against the more hardened Soviet silos and LCCs. US ALCMs have better hard-target kill capabilities, and soon will be sufficient in number to threaten much of the Soviet ICBM force and LCCs, but bomber weapons would take hours to reach the USSR, are needed for strikes on other target classes, and would have to penetrate extensive air defenses. One hundred US MX will carry 1,000 hard-target weapons. Unless more than 100 MX are deployed, the US will not have enough time-urgent hard-target weapons to threaten promptly the entire Soviet silo-based ICBM force until

the early 1990s, when Trident D-5 will be deployed in quantity. By the early 1990s, we expect the Soviets to have deployed significant numbers of mobile ICBMs and MIRVed SLBMs which we cannot target. However, the combination of 100 MX and several thousand ALCMs would provide the overall capability to severely damage most of the silo-based Soviet ICBM force.

Active Defenses

5. ***ABM:*** The United States began deployment of an ABM system to defend ICBMs in the early 1970s, and then, deciding that this system was not effective given treaty limitations, dismantled it. A broad based R&D effort continues on US advanced ABM concepts, but it would take at least seven to 10 years for initial deployment of any new US ABM system.

6. In a large-scale US ballistic missile attack, the ABM system at Moscow, even when its upgrade is completed, would quickly be defeated. The current upgrade of the Moscow ABM defenses could provide the Soviets with a foundation for further expanding their system. The Soviets are developing a rapidly deployable ABM system for which individual above-ground ABM sites could be deployed in months rather than years. If the ABM Treaty were abrogated, the USSR would undertake rapidly paced ABM deployments to strengthen their defenses at Moscow, deploy widespread defenses in the western USSR, and cover key targets east of the Urals. With a Soviet decision made now, widespread defenses could be in place by the late 1980s or early 1990s.

7. ***ATBM:*** The Soviet SA-X-12 mobile SAM in development has been tested against tactical ballistic missile systems. It could also have some capabilities against some US strategic reentry vehicles (all current RVs except Minuteman III). Many hundreds of SA-X-12 launchers are expected to be deployed with Soviet Union and Warsaw Pact ground forces by the late 1980s. The United States has no equivalent system; our Patriot SAM was not given an ATBM capability.

8. ***Air Defenses:*** US homeland air defenses declined from over 2,000 modern interceptors and 200 SAM sites in the early 1960s, to about 300 aircraft, mostly old, in 1982. This path was taken because of the small Soviet bomber force and a lack of defense against the much larger Soviet ballistic missile force. NORAD has 20 new F-15s; over 120 more are programed through 1987. Meanwhile, facing a large and improving US bomber force, the Soviets built a force of 2,400 interceptors and 9,500 SAM launchers, although much of this force would be ineffective against low-altitude bombers. The Soviets will modernize these defenses with over 1,000 new interceptors and over 2,000 SA-10 launchers deployed by the late 1980s, systems with greatly improved technical capabilities against low-altitude penetrators.

9. ***ASW:*** US investment in forces for ASW in general has provided the added benefit of a significant threat to Soviet strategic submarines in particular. The US technical lead is narrowing, but the past two decades of US investment and the superior operational capabilities of US ASW forces continue to give us clear ASW dominance against any Soviet submarines deployed in the Pacific and Atlantic basins. The Soviets, recognizing our ASW capabilities, have deployed the Delta-class and the new Typhoon-class SSBNs with long-range SLBMs, which permit them to patrol in home waters or to launch their missiles from port. They have also invested heavily in general purpose ASW ships, aircraft, and submarines, and adopted a bastion concept of operations to protect their SSBNs from US ASW systems, including attack submarines.

10. The US SSBN force today is considered extremely survivable at sea. No US protective forces of consequence are required to provide protection for our SSBNs. Once they clear their ports, US submarines depend on stealth to avoid Soviet ASW sensors.

Passive Defenses

11. The new US countermilitary strategy requires the destroying of over 7,000 fixed targets in the USSR, 4,000 of which are hardened to at least 100 psi. Conversely, the Soviets are faced with about 4,000 US military targets, of which less than 1,400 are hardened to at least 100 psi.

12. About 40 percent of the nonhardened Soviet facilities that are associated with general purpose and nuclear forces, and that we now consider should be attacked in a countermilitary strike, are either mobile or movable. Much of the forces or equipment normally based at these facilities would be likely to survive a US retaliatory strike and be available for theater operations and support of strategic operations if, as we anticipate, they were to be moved to unknown dispersal locations during the period of mobilization likely to precede strategic nuclear warfare. The US power projection forces based in the CONUS present an asymmetrically easier targeting problem for the Soviets, because these US forces must funnel through a few key ports and airbases to reach Eurasian theaters of conflict.

13. The Soviet civil defense program has been under Ministry of Defense control since 1971; about 150,000 personnel are engaged full time. The US civil defense organization numbers less than 7,000. Soviet civil defense plans, if implemented, theoretically could prevent up to 100 million civilian casualties. By the late 1980s we hope to have comprehensive evacuation plans for over 140 million people in high-risk areas, but at the moment we have only preliminary plans that identify potential evacuation areas for about 40 percent of the at-risk population. Provision has not been made for fallout protection, emergency support equipment, and sustenance in evacuation areas

Command, Control, Communications and Intelligence

14. ***Satellite Warning:*** Until 1982 the United States had a great advantage in satellite warning. Now both sides, assuming undegraded satellites and ground terminals, can provide satellites warning of ICBM launch within a few minutes. The US system covers Soviet ICBM and some SLBM launch areas. The Soviet system covers only the US ICBM fields; a system capable of covering US SLBM launch areas is expected by 1990.

15. ***Ballistic Missile Attack Characterization:*** The United States was first to deploy radars in the early 1960s to detect ICBMs and characterize attacks by size and intended impact points. The Soviets built such sites and are now building more capable radars, including four new radars still under construction and two with some operational capability. Both sides are potentially limited by computer capacity; the United States may lead in this area. Both would be vulnerable to blackout, EMP, or direct attack. The US satellite system, if undegraded, would also provide some characterization data; the Soviet satellites provide only minimal data. The trend will be to more capable data processing by both sides, but both will still be limited to the 35 minutes or less time-of-flight of the missiles in which to decide to ride out or launch on tactical warning.

16. ***Launch on Tactical Warning (LOTW):*** We believe the Soviets are capable of successfully launching their ICBMs on tactical warning before incoming US ICBMs could detonate on Soviet silos, assuming their warning and control systems are undegraded. The United States is also technically capable of LOTW.

17. ***Air Surveillance:*** The Soviets' 1,200-site (6,300 total radars) surveillance network is still porous at low altitudes. New US B-1B, ALCMs, ECM, and Stealth bombers will tend to offset Soviet low-altitude detection improvements, which will include at least 12 new Mainstay AWACS aircraft and over 600 new ground-based radars by 1987. Likewise new Soviet air- and sea-launched cruise missiles would give the thin 77-site NORAD radar network major problems in detecting low-level attacks. The United States will add additional AWACS aircraft to the eight now designated for NORAD use; new OTH radars and DEW line ground-based radar improvements are also programed for the late 1980s.

18. ***Communications:*** The US peacetime communications are far superior, because of a century of US investment in landlines, augmented by many times more satellite channel capacity than the USSR, but this advantage does not lead to any advantage in wartime. US facilities are soft, but numerous and well internetted. Soviet military facilities include hundreds of command and communications bunkers and even more buried antennas. Both sides use aircraft to supplement ground-based communications; some US aircraft are continuously airborne. The Soviets also use ground-mobile systems; they do not keep aircraft on alert.

Although US attacks could destroy many known fixed C³ facilities,

elements of the political leadership and miltary commands probably would survive, and redundancy in Soviet strategic communications would prevent loss of any one channel from disabling the overall system. Likewise the Soviets may not be completely sure of the US network, although they must be aware of some of its key vulnerabilities, such as the President himself and the few entry points into the system. Both sides are upgrading the survivability of their C³.

19. ***Reconnaissance:*** Poststrike reconnaissance is an area of weakness for both sides. Space-based assets are vulnerable to attacks on their ground terminals. Neither side is yet credited with space-based systems that could endure in nuclear war. Both sides possess long-range bomber forces that could be utilized for poststrike reconnaissance. Both sides would probably need to depend on staging aircraft forward in order to conduct reconnaissance deep in the other side's homeland. The Soviets may have an advantage because of weak US air defenses, but the United States has a much larger number of reconnaissance-capable aircraft. Neither side would have anything approaching the reconnaissance capabilities they had prior to conflict; we cannot determine which side would have an advantage.

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF REFERENCES

Bardach, Eugene, and Eric M. Patashnik. *A Practical Guide for Policy Analysis: The Eightfold Path to More Effective Problem Solving*. 5th ed. USA: CQ Press, 2015.

Bracken, Paul. "Net Assessment: A Practical Guide." *Parameters* 36, no. 4 (2006): 90–100. http://www.comw.org/qdr/fulltext/06bracken.pdf.

Committee on Oversight and Government Reform. *The OPM Data Breach: How the Government Jeopardized our National Security for More than a Generation*. Washington, DC: U.S. House of Representatives, 114th Congress, 2016.

Dahl, Erik. "A Homeland Security Net Assessment Needed Now!" *Strategic Studies Quarterly* 9, no. 4 (2015): 62–86. http://search.proquest.com/docview/1812272885.

Department of Defense. *Director of Net Assessment*. DOD Directive 5111.11. Washington, DC: Department of Defense, 2009. www.dtic.mil/whs/directives/corres/pdf/511111p.pdf.

Department of Homeland Security. *Budget-in-Brief Fiscal Year 2006*. Washington, DC: Department of Homeland Security, 2005. https://www.dhs.gov/sites/default/files/publications/Budget_BIB-FY2006.pdf.

———. *Budget-in-Brief Fiscal Year 2016*. Washington, DC: Department of Homeland Security, 2015. https://www.dhs.gov/sites/default/files/publications/FY_2016_DHS_Budget_in_Brief.pdf.

———. *Fiscal Years 2014–2018 Strategic Plan*. Washington, DC: Department of Homeland Security, 2014. https://www.dhs.gov/sites/default/files/publications/FY14-18%20Strategic%20Plan_0_0.PDF.

———. "Joint Statement from the Department of Homeland Security and Office of the Director of National Intelligence on Election Security." October 7, 2016. https://www.dhs.gov/news/2016/10/07/joint-statement-department-homeland-security-and-office-director-national.

———. "Mission." Last published date January 21, 2020. https://www.dhs.gov/office-policy.

———. "Strategy, Plans, Analysis & Risk." Last published date September 20, 2019. https://www.dhs.gov/strategy-plans-analysis-risk.

———. "Testimony of Alan Cohn, Policy's Deputy Assistant Secretary for the Office of Strategic Plans, before the House Committee on Homeland Security, Subcommittee on Oversight, Investigations, and Management regarding How DHS is Implementing a Strategy to Counter Emerging Threats." Last published date July 31, 2017, https://www.dhs.gov/news/2012/02/02/testimony-alan-cohn-policys-deputy-assistant-secretary-office-strategic-plans-house.

———. *The 2014 Quadrennial Homeland Security Review*. Washington, DC: Department of Homeland Security, 2014. https://www.dhs.gov/publication/2014-quadrennial-homeland-security-review-qhsr.

Fagioli, Brian. "Open Whisper Systems Defeats Government Subpoena of Signal Data with Encryption." BetaNews, October 5, 2016. http://betanews.com/2016/10/05/open-whisper-systems-government-subpoena-signal-data-encryption/.

Federal Emergency Management Agency. *Eagle Horizon Continuity Preparedness Exercise*. Washington, DC: Department of Homeland Security, 2015. https://www.fema.gov/media-library-data/1427478016480-1f130d2e9411291637c9a08e22568fa4/2015EagleHorizonFactSheet.pdf.

———. "FEMA Prepares New Study of Annualized Earthquake Losses." Last modified January 3, 2017. https://www.fema.gov/fema-prepares-new-study-annualized-earthquake-losses.

———. *National Mitigation Framework*. 2nd ed. Washington, DC: Department of Homeland Security, 2016. https://www.fema.gov/media-library-data/1466014166147-11a14dee807e1ebc67cd9b74c6c64bb3/National_Mitigation_Framework2nd.pdf.

———. "National Planning Frameworks." Last updated October 30, 2019. https://www.fema.gov/national-planning-frameworks.

———. "National Planning System." Last modified November 15, 2016. https://www.fema.gov/national-planning-system.

———. *National Prevention Framework*. 2nd ed. Washington, DC: Department of Homeland Security, 2016. https://www.fema.gov/media-library-data/1466017209279-83b72d5959787995794c0874095500b1/National_Prevention_Framework2nd.pdf.

———. *National Protection Framework*. 2nd ed. Washington, DC: Department of Homeland Security, 2016. https://www.fema.gov/media-library-data/1466017309052-85051ed62fe595d4ad026edf4d85541e/National_Protection_Framework2nd.pdf.

———. *National Response Framework*. 3rd ed. Washington, DC: Department of Homeland Security, 2016. https://www.fema.gov/media-library-data/1466014682982-9bcf8245ba4c60c120aa915abe74e15d/National_Response_Framework3rd.pdf.

Forrest, Patrick, and Alex Hilliker. "Why the Department of Homeland Security Needs an Office of Net Assessment." *Risk, Hazards & Crisis in Public Policy* 3, no. 3 (September 1, 2012): 1–18. http://onlinelibrary.wiley.com.libproxy.nps.edu/doi/10.1002/rhc3.9/abstract.

Government Accountability Office. "Search." Accessed February 8, 2017. http://www.gao.gov/search?rows=50&now_sort=issue_date_dt+desc%2Ctitle_sort+asc&page_name=main&search_type=Solr&o=0&path=Reports+%26+Testimonies%3AReport&facets=a%3A2%3A%7Bs%3A14%3A%22tx_agency_term%22%3Bs%3A9%3A%22Executive%22%3Bs%3A24%3A%22tx_agency_executive_term%22%3Bs%3A31%3A%22Department+of+Homeland+Security%22%3B%7D&adv_begin_date=&adv_end_date=&adv=0&advanced=1&q=title%3Astrategy.

Greenburg, Andy. "Encryption App 'Signal' Fights Censorship with a Clever Workaround." Wired Magazine, December 21, 2016. https://www.wired.com/2016/12/encryption-app-signal-fights-censorship-clever-workaround/.

Hart, B. H. Liddell. *Strategy*. 2nd ed. New York: Praeger, Inc., 1967.

Haskins, Cecelia, Kevin Forsburg, Michael Kruger and others, eds. *Systems Engineering Handbook: A Guide for System Life Cycle Processes and Activities*. v 3.1 ed. San Diego: International Council on Systems Engineering, 2007.

Heyman, David, and James Jay Carafano. *DHS 2.0: Rethinking the Department of Homeland Security*. Washington, DC: The Heritage Foundation, 2004. http://gateway.proquest.com/openurl?url_ver=Z39.88-2004&res_dat=xri:policyfile&rft_dat=xri:policyfile:article:00069909.

Homeland Security Advisory Council. *Essential Technology Task Force*. Washington, DC: Department of Homeland Security, 2008. https://www.dhs.gov/sites/default/files/publications/hsac_dhs_ettf_report_update.pdf.

———. *Future of Terrorism Task Force*. Washington, DC: Department of Homeland Security, 2007. https://www.dhs.gov/sites/default/files/publications/hsac-future-terrorism-pres-011107.pdf.

———. *Report of the Future of Terrorism Task Force*. Washington, DC: Department of Homeland Security, 2007.

Institute for Defense Analyses. *Net Assessment The Concept, Its Development and Its Future*. Alexandria, VA: Institute of Defense Analysis, 1990. http://www.dod.mil/pubs/foi/Reading_Room/Other/Litigation%20Release%20-%20Net%20Assessment%20concept%20development%20future%20%20199005.pdf.

International Council on Systems Engineering. "What is Systems Engineering?" Accessed February 18, 2018. https://www.incose.org/AboutSE/WhatIsSE.

Jaffe, Greg. "Yoda's Replacement: Air Force Veteran to Lead Legendary Pentagon Office." *The Washington Post*, May 13, 2015. https://www.washingtonpost.com/news/checkpoint/wp/2015/05/13/yodas-replacement-air-force-veteran-to-lead-legendary-pentagon-office/?wprss=rss_national-security.

Joint Chiefs of Staff. *1990 Joint Military Net Assessment*. Washington, DC: Joint Chiefs of Staff, 1990. http://www.dtic.mil/docs/citations/ADA344529.

Kean, Thomas H., and Lee Hamilton. *The 9/11 Commission Report: Final Report of the National Commission on Terrorist Attacks upon the United States*. Washington, DC: National Commission on Terrorist Attacks upon the United States, 2004.

Kissinger, Henry. "National Security Study Memorandum 178." Official memorandum. Washington, DC: Digital National Security Archive, 1973. http://search.proquest.com/dnsa/docview/1679072716/fulltextPDF/4B883ECD82974A3DPQ/12?accountid=12702.

Koerner, Brendan I. "Inside the Cyberattack that Shocked the U.S. Government." Wired Magazine, October 23, 2016. https://www.wired.com/2016/10/inside-cyberattack-shocked-us-government/.

Krepinevich, Andrew F., and Barry D. Watts. *The Last Warrior: Andrew Marshall and the Shaping of Modern American Defense Strategy*. New York: Basic Books, 2015. Adobe Digital Edition.

Malenic, Marina. "Northrop Grumman Resumes LRS-B Work after GAO Dismisses Boeing Protest." *Jane's Defence Weekly*, February 17, 2016. http://search.proquest.com/docview/1765499395.

Marshall, Andrew. "National Net Assessment." Official memorandum. Washington, DC: Digital National Security Archive 1973.

National Consortium for the Study of Terrorism and Responses to Terrorism. *American Deaths in Terrorist Attacks*. University of Maryland, College Park, MD: National Consortium for the Study of Terrorism and Responses to Terrorism, 2015. https://www.start.umd.edu/pubs/START_AmericanTerrorismDeaths_FactSheet_Oct2015.pdf.

National Hurricane Center and Central Pacific Hurricane Center. "NHC Track and Intensity Models." Updated June 11, 2019. http://www.nhc.noaa.gov/modelsummary.shtml.

National Institute of Standards and Technology. "NIST Kicks Off Effort to Defend Encrypted Data from Quantum Computer Threat." Updated January 8, 2018. https://www.nist.gov/news-events/news/2016/04/nist-kicks-effort-defend-encrypted-data-quantum-computer-threat.

National Severe Storms Laboratory. "Flood Forecasting." Accessed January 28, 2017. http://www.nssl.noaa.gov/education/svrwx101/floods/forecasting/.

———. "Tornado Forecasting." Accessed January 28, 2017. http://www.nssl.noaa.gov/education/svrwx101/tornadoes/forecasting/.

NOAA National Centers for Environmental Information. "Billion-Dollar Weather and Climate Disasters: Overview." 2017. https://www.ncdc.noaa.gov/billions/.

———. "Billion-Dollar Weather and Climate Disasters: Summary Stats." Accessed January 25, 2017. https://www.ncdc.noaa.gov/billions/summary-stats.

———. "Billion-Dollar Weather and Climate Disasters: Time Series." 2017. https://www.ncdc.noaa.gov/billions/time-series.

Risk Steering Committee. *DHS Risk Lexicon, 2010 Edition*. Washington, DC: Department of Homeland Security, 2010. https://www.dhs.gov/xlibrary/assets/dhs-risk-lexicon-2010.pdf.

Schutte, John M. *Casting Net Assessment*. Maxwell Air Force Base, AL: Air University Press, Air Force Research Institute, 2015. http://www.au.af.mil/au/aupress/digital/pdf/paper/dp_0016_schutte_casting_net_assessment.pdf.

Secretary of Defense and Director of Central Intelligence. *U.S. and Soviet Strategic Forces Joint Net Assessment*. Washington, DC: Secretary of Defense and Director of Central Intelligence, 1983.

Skypek, Thomas M. "Evaluating Military Balances through the Lens of Net Assessment: History and Application." *Journal of Military and Strategic Studies* 12, no. 2 (Winter 2010): 1–25. https://www.ciaonet.org/attachments/17550/uploads.

Szoldra, Paul. "This is Everything Edward Snowden Revealed in One Year of Unprecedented Top-Secret Leaks." Business Insider, September 16, 2016. http://www.businessinsider.com/snowden-leaks-timeline-2016-9.

Tzu, Sun. *The Art of War*. Translated by Ralph D. Sawyer. Boulder, CO: Westview Press, 1994.

United States Census Bureau. “Fast Facts.” Accessed January 25, 2017. https://www.census.gov/history/www/through_the_decades/fast_facts/.

United States Geological Service. “Can You Predict Earthquakes?” Last modified November 16, 2016. https://www2.usgs.gov/faq/categories/9830/3278.

von Clausewitz, Carl. *On War*. Translated by Michael Howard and Peter Paret. New York: Oxford University Press, 2007. http://www.myilibrary.com?ID=114695.

Wilson, Kurt E., Roberto Szechtman, and Michael P. Atkinson. *A Sequential Perspective on Searching for Static Targets*. Amsterdam, Netherlands: Elsevier, 2011. https://www.hsdl.org/?view&did=696971.

INITIAL DISTRIBUTION LIST

1. Defense Technical Information Center
   Ft. Belvoir, Virginia

2. Dudley Knox Library
   Naval Postgraduate School
   Monterey, California